

Specifications

A Exterior Applications of Powder Coatings on Steel

Project

Builder

General planner / Main Contractor

Architect

Façade Engineering

Metal Construction / Fabricator

Date

A0 Coating and finishing company for powder coating on aluminium

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Processable part sizes: 13 x 2.5 x 3.6m (length/width/height)
weighing up to 3000 kg per unit

Larger parts or heavier weights are possible upon request, depending on the construction of the respective element.

A1 Requirements for the work-pieces to be coated

The textures and fabricated elements must meet the requirements for powder coating.

Defects in construction which would enhance corrosion, e.g. inappropriate combinations of non-combinable materials and/or different metals, cavities, gaps or other spaces which cannot be ventilated, or other components or surfaces which are not suited for coating, should be avoided.

Aluminium sheets must be made of pure aluminium (Al 99.5) of the 1000 series, manganese alloys (AlMn 1) of the 3000 series, magnesium alloys (AlMg 0.5-3) of the 5000 series or aluminium profiles manufactured from AlMgSi alloys (0.3-1.0) corresponding to the 6000 series as defined in EN 573-3.

A2 Pre-treatment

The pre-treatment of the fabricated work-pieces that are to be coated requires special care as the quality and durability of the coating greatly depends on it.

Aluminium components for exterior application require wet-chemical or electro-chemical pre-treatment, if necessary, after mechanical cleaning. The pre-treated components, when clean and completely dry, must be either powder coated immediately or within one day at the latest. The quality guidelines published by GSB and QUALICOAT and international norms according to EN, BS and ASTM must be observed precisely.

- Chrome-free titanium finishing processes must be employed for the pre-treatment of the fabricated elements. Follow quality guidelines of GSB QUALICOAT and prEN 12206-1 to the extent applicable.

- In the event that chemical pre-treatment is not possible e.g. due to oversized work-pieces, pre-treatment has to be effected by means of sweep-blasting with iron-free abrasives (corundum).

A3 Coating System

One-coat system (NOT suited for sweep-blasted work-pieces)

The minimum coating thickness in one-coat systems is 60 µm of non porous powder coating on corners and edges. On visible surfaces the coat must have an average coating thickness of at least 70 µm.

All coat thicknesses must be measured according to ISO 2360.

- The fabricated elements must be powder coated with approved ENVIRAL[®] polyester façade powder coating for exterior applications (façade).
- The fabricated elements must be powder coated with approved highly weather resistant ENVIRAL[®] polyester façade powder coating for exterior applications (façade).

Two-coat system

ENVIRAL[®] thermally cured undercoat is employed as powder primer. The coating thickness of the primer coat should not be less than 60 µm. The total coating thickness of powder primer and top coat must be 120 µm of powder coating on corners and edges.

In order to achieve sufficient opacity of a UV non-permeable coating, it may become necessary to apply organic pigmented top coats at a higher film thickness.

All coat thicknesses must be measured according to ISO 2360.

- The fabricated elements must be powder coated with approved ENVIRAL[®] polyester façade powder coating for exterior applications (façade).
- The fabricated elements must be powder coated with approved highly weather resistant ENVIRAL[®] polyester façade powder coating for exterior applications (façade).

A4 Requirements for the Coating & Coating Material

For powder coating only products approved by GBS or QUALICOAT and conforming to the quality guidelines may be employed.

Follow the processing guidelines issued by the powder coating manufacturer and by ENVIRAL[®] as defined in the current versions of Product Datasheets & Technical Information Sheets.

- Use approved ENVIRAL[®] polyester façade powder coating for exterior applications (façade) as powder coating material according to the quality guidelines issued by GSB or QUALICOAT Class 1.
Alternatively the standards of BS 6496 and prEN 12206-1 and AAMA 2603-98 can be used.
- Use approved highly weather resistant ENVIRAL[®] polyester façade powder coating for exterior applications (façade) as powder coating material according to the quality guideline issued by QUALICOAT Class 2.
- Use ENVIRAL[®] thermally cured undercoat as powder primer according to the Product Datasheet.
- Use products sampled by ENVIRAL[®] or materials of similar quality for coatings. The quality of other materials must be equivalent, especially with regard to the following points:

Colour and effect

Gloss and surface characteristics such as flow properties and texture

Resistance to weathering and anti-corrosion protection

Mechanical properties

A5 Colour

- ENVIRAL[®] colour:
- Powder coating manufacturer colour:
- International colour standard (RAL, etc.) :
- Customer colour:

A6 Gloss Level According to ISO 2813/60° Angle

- Glossy, with a gloss level of 80-95
- Semi glossy, with a gloss level of 65-75 for approved ENVIRAL[®] polyester façade powder coating for exterior applications (façade)
- Semi glossy, with a gloss level of 70-80 for highly weather resistant ENVIRAL[®] polyester façade powder coating for exterior applications (façade)
- Matt, with a gloss level of 20-30 for approved ENVIRAL[®] polyester façade powder coating for exterior applications (façade)
- Matt, with a gloss level of 25-35 for highly weather resistant ENVIRAL[®] polyester façade powder coating for exterior applications (façade)

A7 Surface

- Smooth flow
- Rough texture, glossy surface
- Fine texture
- Special effect surface, e.g. Metallic, Flip-Flop, etc.

A8 Test data

Upon request the coating company must offer proof in the form of the manufacturer's datasheets in their current version that the powder coating being used conforms to the following test results and quality characteristics.

- Coating with approved ENVIRAL[®] polyester façade powder coating for exterior applications (façade) must meet the following characteristics with regard to weathering, corrosion protection and mechanical properties:

Test	Norm	Results	
Colour Fastness to Light	ISO 105/B01	min. scale ≥ 7 of "Wool Scale"	
Colour Fastness to Weathering	ISO 105/A02	min. scale ≥ 4 of "Grey Scale"	
Resistance to Weathering	conforms to GSB or QUALICOAT Class 1 quality guidelines	1 year of Florida-Test	
		<input type="checkbox"/> One-coat system	<input type="checkbox"/> Two coat system
Resistance to Humidity	ISO 6270	1000h*)	1500h*)
Resistance to Salt Spray	ISO 9227	1000h**)	1500h**)
Resistance to Mortar	ASTM C 207 and ASTM D 3260	no negative effect	no negative effect

These data were obtained using 0.7 mm chromated aluminium panels with a coating thickness of 60-70 µm in a one-coat system and approximately 120 µm in a two-coat system and a smooth glossy finish

**) No formation of bubbles; blistering at cross cut: maximum of 1 mm*

****) Blistering at cross cut: maximum of 1 mm*

		<input type="checkbox"/> Glossy	<input type="checkbox"/> Semi-glossy <input type="checkbox"/> Matt	<input type="checkbox"/> Glossy <input type="checkbox"/> Semi-glossy <input type="checkbox"/> Matt
Coating Thickness	ISO 2360	60-70 µm	60-70 µm	120 µm
Adhesion	EN ISO 2409	0*)	0*)	0**)
Bend Test	EN ISO 1519	≤ 3 mm	≤ 5 mm	≤ 8 mm
Erichsen Cupping Test	EN ISO 1520	≥ 8 mm	≥ 5 mm	≥ 3 mm
Impact Test	ASTM D 2794-90 20 inch-pounds	No cracks extending to substrate		Possible cracks on concave area; however, coating does not detach
Buchholz Indentation Test	ISO 2815	≥ 87	≥ 87	≥ 87
Cutting, Drilling, Milling			No chipping	

These data were obtained using 0.7 mm chromated aluminium panels with a coating thickness of 60-70 µm in a one-coat system and a smooth finish and a total coating thickness of 120 µm in a two-coat system and a smooth finish. It can also serve as reference for thicker substrates, which are difficult to measure. Product specific parameters such as colour, effect and surface texture may result in minor deviations from the values stated in the table above.

**) 1 mm between cuts*

****) 2 mm between cuts*

- Coating with approved highly weather resistant ENVIRAL[®] polyester façade powder coating for exterior applications (façade) must meet the following characteristics with regard to weathering, corrosion protection and mechanical properties:

Test	Norm	Results	
Colour Fastness to Light	ISO 105/B01	min. scale ≥ 7 of "Wool Scale"	
Colour Fastness to Weathering	ISO 105/A02	min. scale ≥ 4 of "Grey Scale"	
Resistance to Weathering	conforms to quality guidelines of QUALICOAT Class 2	3 years of Florida-Test	
		<input type="checkbox"/> One-coat system	<input type="checkbox"/> Two coat system
Resistance to Humidity	ISO 6270	1000h*)	1500h*)
Resistance to Salt Spray	ISO 9227	1000h**)	1500h**)
Resistance to Mortar	ASTM C 207 and ASTM D 3260	no negative effect	no negative effect

These data were obtained using 0.7 mm chromated aluminium panels with a coating thickness of 60-70 µm in a one-coat system and approximately 120 µm in a two-coat system and a smooth glossy finish

**) No formation of bubbles; blistering at cross cut: maximum of 1 mm*

****) Blistering at cross cut: maximum of 1 mm*

		<input type="checkbox"/> Glossy	<input type="checkbox"/> Glossy
		<input type="checkbox"/> Semi-glossy	<input type="checkbox"/> Semi-glossy
		<input type="checkbox"/> Matt	<input type="checkbox"/> Matt
Coating Thickness	ISO 2360	60-70 µm	120 µm
Adhesion	EN ISO 2409	0*)	0**)
Bend Test	EN ISO 1519	≤ 12 mm	≤ 15 mm
Erichsen Cupping Test	EN ISO 1520	≥ 3 mm	≥ 2 mm
Impact Test	ASTM D 2794-90 20 inch-pounds	Possible cracks on concave area; however, coating does not detach	
Buchholz Indentation Test	ISO 2815	≥ 87	≥ 87
Cutting, Drilling, Milling		No chipping	

These data were obtained using 0.7 mm chromated aluminium panels with a coating thickness of 60-70 µm in a one-coat system and a smooth finish and a total coating thickness of 120 µm in a two-coat system and a smooth finish. It can also serve as reference for thicker substrates, which are difficult to measure. Product specific parameters such as colour, effect and surface texture may result in minor deviations from the values stated in the table above.

**) 1 mm between cuts*

****) 2 mm between cuts*

A9 Protection During Transport & Further Processing

Suitable **packaging materials** should be used to protect coated components during storage, transport and assembly against mechanical and chemical agents such as those in mortar, plaster, cement and concrete.

The user must make sure that the packaging materials and all other materials are used as intended and can be removed without difficulty. To avoid damage to coated surface check **adhesive tapes**, etc. for their suitability/stability.

In particular, make sure that incorrect **storage** does not lead to milky white spots on the surface, e.g. under packing materials, caused by a combination of moisture and warmth. These spots can be removed by applying heat, e.g. through post-tempering in an oven or with an industrial heating device.

Sealing compounds and other material such as glazing aids, drilling, cutting and other kinds of lubricants which may come into contact with coated surfaces must be pH neutral and free of any substances which could damage the coating. They must be subjected to a suitability test by the user. ENVIRAL[®] will provide a list of tested sealing compounds upon request.

Direct pasting together of glass panes with coated surfaces – i.e. **structural glazing** also requires appropriate testing and approval of the materials by the adhesive manufacturer. ENVIRAL[®] will provide a list of products which have been tested with powder coatings upon request.

If the coated work-piece must undergo subsequent **mechanical processing** such as sawing, drilling, milling and cutting the total powder coating thickness of these work-pieces should not significantly exceed 120 µm, as this may damage the coating. If need be, the defective parts have to be repaired using a proper repair system.

Follow the **cleaning guidelines** issued by the powder coating manufacturer and recommended by ENVIRAL[®] in the current version of the Technical Information Sheet ENV 801a carefully.

Warranty

The nature and scope of the warranty will be defined in a separate agreement concluded between the contractual partners.

In this case, the current version of product guarantee which the powder coating manufacturer extends to the coating company for the powder coatings employed will become part of the warranty agreement.

The product warranty applies to:

- Approved ENVIRAL[®] polyester façade powder coating for exterior applications (façade) → *five years*
- Approved highly weather resistant ENVIRAL[®] polyester façade powder coating for exterior applications (façade) → *ten years*

The product guarantee of the powder coating manufacturer comprises:

➤ **Delivery Specifications**

Based on the current versions of Product Datasheets & Technical Information Sheets issued by the powder coating manufacturer and by ENVIRAL[®].

➤ **Colour Fastness to Light**

Colour fastness to daylight, tested according to ISO 105/B01, resulting in a value of at least scale ≥ 7 of "Wool Scale" rating.

➤ **Colour Fastness to Weathering**

Colour fastness to weathering, tested according to ISO 105/B01, resulting in a value of at least scale ≥ 4 of "Grey Scale" rating.

➤ **Gloss Level**

The gloss level has been established according to ISO 2813 and must be observed in accordance with the limiting values determined by the powder coating manufacturer for the individual gloss levels.

➤ **General impression**

The product guarantee extends to the uniformity of gloss, colour and texture of parts coated exclusively with ENVIRAL[®] products, determined in a visual assessment, carried out without the use of any aid at a distance of 5 m for external elements and 3 m for internal elements.

The finished, coated surface will be assessed in accordance with the guidelines issued by the Verband der Fenster und Fassadenhersteller e.V. (*Registered Association of Window- and Façade Manufacturers, Germany*) in their Code of Practice No.02, version of April 1997 (*Visuelle Beurteilung von organisch beschichteten Oberflächen auf Stahl [Visual Assessment of Organically Coated Surfaces on Steel Substrates]*) and delivered according to the quality standards stated therein. Claims exceeding these provisions shall only be valid if they are confirmed in written form by ENVIRAL[®].

Claims shall be considered as arising on the basis of this product guarantee, if relevant defects have occurred on more than 5% of the buildings surface to be assessed and if these defects impair the general impression of the building to a considerable extent. Defects which result from uneven exposure to sunlight or other surrounding conditions and environmental influences are not covered by this warranty.

Contractual partners:

City and date:

These documents were prepared with a great deal of care. At the same time, ENVIRAL® cannot be held responsible for their completeness or accuracy.