

Application Guide

Powder on Powder Wood Finish



Application Guide for Architectural Powder Coatings using Powder on Powder Wood Finish

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1.0 Introduction

This document provides guidelines for the factory application of powder on powder wood finish using Jotun Facade Powder Coatings for the aesthetic and corrosion protection of architectural aluminum and claddings.

2.0 General overview

Jotun Facade Powder Coatings are specifically designed to meet the stringent requirements of the construction industry. It provides longevity to the projects and building components by ensuring gloss retention, colour stability and corrosion protection.

The critical steps that must be controlled are:

- 1) Surface preparation and pre-treatment
- 2) Drying
- 3) Base Coating Application
- 4) Melting/Flowing
- 5) Storage of Base Coated Components
- 6) Jigging on Horizontal Bed and Powder Coating of the Top Coat
- 7) Curing
- 8) Final inspection and quality control

3.0 Surface preparation and pre-treatment

Proper attention should be given to the cleaning and preparation of the aluminum components.

The aluminum or aluminum alloy must be suitable for the pre-treatment and the coating process. It should allow the coating properties to perform as specified in the relevant technical properties provided in the Product Data Sheets for Jotun Façade, as well as other properties specified for these systems. The substrate must be bare clean, free from corrosion, and not exposed beforehand to any anodic or organic coating.

There must be no sharp edges. The edges radii must allow the coating to completely cover the whole object's surface to ensure adequate film thickness and prevent holidays.

3.1 Handling

- 3.1.1 Components or objects must be carefully handled. Avoid contamination with dust, oil, fat, finger marks, etc.
- 3.1.2 Care should be taken to secure a proper treatment of the total area.

3.2 Pre-treatment

- 3.2.1 It is recommended that the following pre-treatment is performed. Moreover, always follow the chemical supplier's recommendation.

- a) Degreasing / etching – alkaline or acidic. Etching degree must be ≥ 1 g/m².
And ≥ 2 g/m² if the coated component is exposed to sea climate area.
- b) Rinse
- c) Acid wash
- d) Rinse
- e) Chromating
- f) Rinse
- g) Rinse, using demineralized water (the last running water from the object should be tested at 20°C. The readings should be taken from the open sections and readings should be below 30 μ Siemens/cm).

3.2.2 The coating thickness of the chromate conversion layer should be:

Yellow chromate = 0.6 – 1.2 g/m²

Green chromate = 0.6 – 1.5 g/m²

3.2.3 Chrome-free pre-treatment

Suitable chrome-free pre-treatments are also recommended. Due to the variety of chrome-free pre-treatments available today, only the approved systems from Qualicoat and GSB should be used. Detailed advice should be sought from the pre-treatment supplier.

4.0 Drying

Pre-treated aluminum components should be dried in an oven. Maximum object temperatures in the drying oven must not exceed 100°C. Perform the process according to the chemical supplier's written instructions.

5.0 Base Coat Application

Pre-treated aluminum components should never be handled with bare hands.

Pre-treated aluminum components are to be transferred to the coating process immediately in a clean and dry state, to avoid deterioration of the pre-treatment integrity. Pre-treated components should be powder coated within 12 hours. Otherwise, pre-treated components should be properly stored in a cool, dry place and should be covered with a clean plastic sheet.

A single coat application should be undertaken in one operation, to a minimum film thickness of 60 microns for exposed areas. The coating thickness should not exceed 120 microns if the coated aluminum component is to be treated mechanically after coating (i.e. sawing, milling, drilling, etc.).

6.0 Melting/Flowing

Depending on the final appearance of final coating, the initial powder coating (base coat) on the components is melted/gelled in an oven, with a temperature setting ranging from 100° - 150°C. The temperature is best obtained by measuring it at the thickest wall of the object, while the oven is fully loaded.

The air temperature in the curing zone must not deviate from the adjusted nominal temperature by more than $\pm 10^{\circ}\text{C}$.

7.0 Storage of Base Coated Components

Base coated aluminum components should never be handled with bare hands.

Base coated components should be unloaded and transferred to a clean rack or other similar container. Components should be allowed to cool down prior to the application of the final coating. Base coated components should never be dropped or collide with any hard surface to prevent damage to the base coating. Base coated components should be decorated with the suitable powder coating for powder on powder application within 12 hours. Otherwise, base coated components should be properly stored in a cool, dry place and should be covered with a clean plastic sheet. To avoid deterioration of the base coat components, maximum storage of base coated components should be < 72 hours.

8.0 Jigging on a Horizontal Bed and Powder Coating with a Top Coat

Proper attention should be given to the application room.

Good housekeeping is a must to minimize contamination.

Application room temperature must be maintained at < 30°C and relative humidity < 50%.

Proper maintenance of equipment (including cleaning) is a must to have reproducible results.

8.1 Horizontal Screen/Die Process

Base coated aluminum components are assembled and secured one by one on a steel rectangular frame on the designing table.

Proper precaution should be taken before powder coating (e.g. distance between screen/die and aluminum component is checked, screen/die are conditioned, screen/die are cleaned and not clogged etc).

Once the steel rectangular frame is full and secured, the screen / die from the cleaning station is lifted and transferred to the designing table.

Small amounts of top coat powder coatings are applied on both sides of the screen / die. A special brush is used for creating the electrostatic field.

Using the special brush, two operators brush the top coat powder coating onto the screen/die at a constant speed / motion (from one side to the other) and constant pressure. From the opposite side, again the same brushing technique is applied to complete one full cycle of coating on one side of the aluminum component. Using visual assessment, operator needs to verify if one or more passes are required to meet the design / pattern requirements.

Operators lift the screen / die and rotate the profiles to the next surface to be decorated. That process is repeated until all the desired sides of the profiles are decorated with top coat.

Once all sides are powder coated, the steel frame is transferred to a steel trolley for curing.

8.2 Rotary Drum Process

Base coated aluminum components are assembled and secured one by one on the steel rectangular table.

Proper precaution should be taken before decoration (e.g. distance between screen/die and aluminum component is checked, screen/die are conditioned, screen/die are cleaned and not clogged, special brush is clean etc).

The rotary drum is filled with top coat powder coating and, is assembled and fitted inside the rotary bed.

After assembling the rotary drum inside the rotary bed, the rotary bed is lowered. The decoration process is initiated by rotation and forward motion of the drum. One pass of the rotary bed over one side of the aluminum component is given. Using visual assessment, operator needs to verify if one or more passes are needed to meet the design / pattern requirements.

After one pass, the rotary bed is lifted and the coated aluminum components are rotated (showing the base coat) and secured. The same procedure is repeated for the other remaining sides of the aluminum component.

9.0 Curing

The powder coated aluminum components must be cured as specified by Jotun Powder Coatings for the product used (see the relevant Product Data Sheet). The temperature of the object to be coated must be recorded once a week. The temperature is best obtained by measuring it at the thickest wall of the object, while the oven is fully loaded.

The air temperature in the curing zone must not deviate from the adjusted nominal temperature by more than $\pm 10^{\circ}\text{C}$.

10. Handling

Coated aluminum components should be cooled to below 40°C before handling.

Precaution should be taken to avoid damages on the finished coating during stacking, packaging, storing and transportation.

11. Final inspection and quality control

Thorough inspection and coordination with the other application steps are essential for a quality coating. Inspection should be considered as part of the process control operation and not just a decision point for approving or rejecting coatings. If each processing steps are done correctly, a high quality coating is assured.

Regular quality control tests to be carried out after melting/flowing of the base coat include film thickness, visual assessment of the color and visual appearance of the coating. The surface of the coating must be continuous and damage-free. The base color of the coating must be even.

Regular quality control tests to be carried out after the curing process include film thickness, visual assessment of the color, gloss, adhesion and other mechanical properties, and visual appearance of the coating. Cure test can be carried out using the MEK (Methyl Ethyl Ketone) test.

12. Packing

Special care must be taken when loading and unloading the coated components and objects. Reasonable care should be exercised during handling. To prevent any damage during transportation, each coated object or component should be packed individually and isolated from other objects or components by a craft paper, plastic sheet, foam pad or any other equivalent that serves the purpose. Regular adhesive tapes should never come into direct contact with the coating. Should protective tape be required, then only a specially designed tape for the protection of coated aluminum shall be used. No residue of any nature should be left on the finished product. If coated aluminum components are wrapped with any plastic sheet, these coated aluminum components should not be subjected to high heat or high humidity or direct sunlight.

Note: The information on this Application Guide is given to the best of the manufacturer's knowledge, based on laboratory testing and practical experience. Jotun Powder Coatings reserves the right, without notice, to alter or change the content of this Application Guide.

Jotun Powder Coatings. Revised April 2016

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