



Application Guide for
Jotun Ultra One



Application Guide for Jotun Ultra One Powder Coatings for Engineered Wood

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1.0 Introduction

This document provides guidelines for the factory application of Jotun Ultra One Powder Coatings) for the aesthetic and surface protection of Engineered Wood.

2.0 General overview

Jotun Ultra One is a single coat powder coating product specifically designed for Engineered Woods. Jotun Ultra One Powder Coatings are designed to meet the general Engineered Wood furniture industry's mechanical and chemical requirements, with excellent stain resistance towards most household chemicals.

The critical steps that must be controlled are:

- 1) Quality Control of Incoming Raw Engineered Woods
- 2) Surface preparation
- 3) Racking / Hanging
- 4) Pre-Heating Using Infra-Red Ovens
- 5) Powder Coating Application of Jotun Ultra One
- 6) Curing using Infra-Red (IR) Ovens
- 7) Final inspection and quality control
- 8) Packing

3.0 Scope

The Application Guide offers product details and recommended practices for the use of the product.

The data and information provided are not definite requirements. They are guidelines to assist in smooth and safe use, and optimum service of the product. Adherence to the guidelines does not relieve the applicator of responsibility for ensuring that the work meets specification requirements. Jotun's liability is in accordance with general product liability rules.

The Application Guide (AG) must be read in conjunction with the relevant specification, Technical Data Sheet (TDS) and Safety Data Sheet (SDS).

4.0 Safety Considerations

Safety is of utmost importance in any powder coating application plant. Proper maintenance of equipment and good housekeeping must always be on the top list of the daily, weekly and monthly routines of any powder coating application plant. Suitable Personal Protective Equipment (PPE) should always be worn in the powder application line. These includes the following:

- a. Cotton overall
- b. Dust mask
- c. Safety goggles
- d. Hand gloves
- e. Ear plugs or muffs
- f. Anti-static steel toe safety shoes
- g. Hard hat

Please refer to relevant and updated Jotun product SDS.

5.0 General Consideration of Application of Powder Coatings on Engineered Wood

Jotun Ultra One can be applied using both corona or tribo guns, however, corona guns are most commonly used. The surface of flat side and edges should have an even and desired film thickness. It is strongly recommended to control the coating thickness on the edges by using a so called "Field control" or "Counter electrode" which gives possibility to adjust the strong field lines to control the "picture frame effect".

Powder coating should be applied when the Engineered Wood surface temperature is 40° - 60°C.

If it is difficult to achieve an even powder layer, or the powder is not attracted to the Engineered Wood it might be that the Engineered Wood has too low moist content, it can also be that the boards general conductive properties is not good enough, if outgassing or cracking issues occurs on the edges it most likely, due to, too high moist content or it can also be a result of pore density profile of the Engineered Wood board, a moisture controlled environment at the coating and application area will significantly improve and stabilize coating properties and smoothen out seasonal variation.

Gun configuration: at line speed up to 4 meter per minute it is recommended to have a configuration of the application guns in one row on each side, in height in the application booth, this due to the Engineered Wood's poor electrical conductance and discharging ability to ground. Each time a corona gun, spray a MDF item, a charge is built up on the Engineered Wood which influences and reduces the powder transfer efficiency. At higher line-speed, a gun configuration with two rows on each side can be a good and necessary alternative.

Based out from object size, line-speed, m²/hour, quality demands, for best advice and support a close cooperation with local Jotun TSS and the equipment supplier is recommended.

For sustainable results, it is recommended to document successful coating parameters.

6.0 General Consideration of Curing of Powder Coatings on Engineered Woods

The Infra-Red (IR) preheater and the IR curing oven should specifically be used for this purpose. IR wavelength that correspond to Engineered Wood powder coating (in the spectra of IR-M medium to IR-L long wave), should be the ideal factor for an oven for curing Engineered Wood powder coatings. Rebuilding of old convection oven or use of an existing convection oven (made to cure powder coatings on metallic substrates) can be used after modification but is not highly recommended. Existing IR oven configured for metal coating needs to be checked if it is found suitable.

The curing conditions may vary depending on IR curing oven system and design. The curing schedule of the powder coating can be found on the labels of the powder coating box or in the corresponding product Technical Data Sheets (TDS). The final appearance of the coating is highly depending on the MDF's properties and condition.

7.0 Quality Control of Incoming Raw Engineered Woods

Around the world, there are a lot of MDF manufacturers with different brands. And not all manufactured Engineered Woods are suited for powder coatings. The general properties that makes an Engineered Wood suitable for powder coatings are as follows:

- Homogenous density profile as much as possible
- Bulk density of 740 - 900 kg /m³
- Internal bonding strength
- Moist content of 4.5 - 6.5%

8.0 Surface Preparation

The Engineered Wood pieces to be coated should be free from dust, raised fibers, grease and marks from pencil, ink or felt-tip pens and other contamination.

The Engineered Wood should be prepared so appropriately, that surface and texture are achieved. Edges and corners should be properly sanded and rounded to minimum 1.5 mm (radius). Engineered Woods that are routed, should be sanded (or prepared in other way e.g. thermo-smoothing) using 240 grain (minimum). Applicator should quality assure that the desired surface finish is achieved. After sanding, routing, drilling or other processes, the substrate surface must be thoroughly cleaned using a clean compressed air.

9.0 Racking / Hanging

Metal hooks with a diameter of 5 - 8 mm are recommended to achieve sufficient conductivity and these metal hooks should tightly fit the drilled holes. Drilled holes are recommended to not be deeper than 75% of the Engineered Woods thickness'. In general, Engineered Woods to be powder coated should be hanged at two points.

When powder coating smaller Engineered Woods, one hook may be sufficient, but needs to be confirmed by the applicator. The distance between the hanging holes is recommended not to exceed 700 mm. And in cases, that the above the recommended distance is not suitable, a third hook is recommended to secure correct and proper grounding and other application properties. Depending on the board thickness, the distance between hanged objects is generally 150-200 mm is sufficient.

Engineered Woods should always be at room temperature. Working temperatures should never exceed 40°C.

Due to Engineered Wood's low electrical conductance, it is always recommended to check the hooks contact point to the conveyer's earth to secure a proper electrical contact.

The hanging racks or hanging jigs are preferably powder coated and should be used for some time before cleaning. The deposited powder coatings in the hanging racks or hanging jigs insulates the metal frame, therefore, the incoming powder coating cloud will be less attracted from other grounding points other than the low conductive Engineered Woods.

10.0 Pre-heating Using Infra-Red

The only reason for preheating the Engineered Wood board is to achieve sufficient electrical conduciveness of Engineered Woods, preheating of Engineered Woods is a must and strongly recommended. The surface temperature of Engineered Woods should be 65° - 80°C. The surface temperature should not exceed 85°C, due to water evaporation which can cause the board to be non-conductive. The exact preheating conditions needs to be determined out from the Engineered Woods properties.

If the Engineered Woods have no or lost its conductivity, then, the moist content should be checked. The moisture content of the Engineered Wood should be within 4.5 - 6.5%. Otherwise, the MDFs should be pre-conditioned.

11.0 Powder Coating Application of Jotun Ultra One

For optimum powder coating application process, it is recommended that grounding measurements are conducted on a regular basis. Resistance to ground should always be < 1.0 megaohm.

It is recommended to use a flat jet nozzle for powder coating application.

Jotun Ultra One should be applied on the Engineered Wood with a surface temperature of 40° - 60°C.

Distance to object should be at least 200 – 350 mm.

Jotun Ultra One have a good chargeability during the corona application. It is recommended to start the corona application of 50 KV and 20 μ A on the application current. Spraying application parameters may be adjusted to achieve the final coating

requirements.

Target coating thickness of 90 – 130 microns (edge and flat sides)

It is advisable to quality assure the reclaim powder prior to any use. Moreover, the use of sieving equipment is recommended to break any agglomeration and remove any foreign matter in the reclaim powder. It is recommended that reclaiming is done automatically. Virgin to reclaim ratio needs to be closely monitored. Normally, the ratio of reclaim to virgin should not exceed 30%.

12.0 Curing of Jotun Ultra One Using Infra-Red Curing Oven

Jotun Ultra One is a low temperature Engineered Wood powder coating with the ability to seal the Engineered Wood and create a final surface layer in one coating with superior mechanical and chemical properties with the desired visual look.

Jotun Ultra One has a curing schedule of 130°C for 4 mins (surface temperature).

Curing temperature is recommended to be reach in 60-90 seconds.

Please refer to relevant updated Technical Data Sheet.

It is recommended is to check the IR curing oven at least once a day with a proper oven tracker. All six sides should be measured.

13.0 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 a part of the process control operation and not just a decision point for approving or rejecting coatings. If each processing step is done correctly, a high coating quality is assured.

Regular quality control tests to be carried out when the Engineered Wood reached room temperature (23°C) after the curing process. Tests include film thickness, visual assessment of the color, gloss, adhesion, swelling test and other mechanical properties, and physical appearance of the coating. Cure test can be carried out using the MEK (Methyl Ethyl Ketone) test.

Please refer to updated relevant product TDS.

13.1 Post Cure Handling

Coated Engineered Woods 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.

14.0 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 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 tape designed for the protection of coated MDFs must be used.

No residue of any nature should be left on the finished product.

The suitability of any packaging material to be used for protecting coated MDFs must be quality assured by the applicator prior to any use.

If coated Engineered Woods are wrapped with any plastic sheet or any other suitable protection material, these coated Engineered Wood components must not be subjected to high heat, 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. July 2018

THIS APPLICATION GUIDE SUPERSEDES ALL PREVIOUSLY ISSUED VERSIONS