



**Application Guide for**  
Primax Protect



# **Application Guide for Primax Protect Powder Coatings**

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## 1.0 Introduction

This document provides guidelines for the factory application of Primax Protect for the corrosion protection of ferrous substrates.

## 2.0 General overview

Primax Protect are zinc rich powder coating designed as a primer coat on blast-cleaned, phosphated and galvanized steel objects and structures. It combines a high level of corrosion resistance with advanced mechanical and degassing properties, excellent adhesion to substrate and inter-coat adhesion.

The critical steps that must be controlled are:

- 1) Surface preparation and pre-treatment
- 2) Drying
- 3) Primax Protect application
- 4) Partial curing
- 5) Jotun top coat application
- 6) Curing of the coating system
- 7) Final inspection and quality control
- 8) Packing

## 3.0 Scope

The AG (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 AG must be read in conjunction with the relevant specification, TDS (Technical Data Sheet) and SDS (Safety Data Sheet) for all the products used as part of the coating system.

## 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 list of the daily, weekly and monthly routines of any powder coating application plant. Suitable PPE (Personal Protective Equipment) should always be worn in the powder application line.

Please refer to relevant Jotun product SDS for further information.

## 5.0 Surface preparation and pre-treatment

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

The ferrous component shall be suitable for pretreatment and the coating process. It should allow the coating properties to perform as specified in the relevant TDS for Primax Protect as well as other properties specified for these systems. The substrate shall 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.

### 5.1 Handling

5.1.1. Components or objects must be carefully handled. Avoid contamination with dust, oil, fat, finger marks, etc.

5.1.2 Care should be taken to secure a proper treatment of the total area.

### 5.2 Grit blasting or sweep blasting

5.2.1 Grit Blasting on steel substrates

When modern sophisticated coatings are applied for surface protection, there is no truly satisfactory or economically equivalent alternative process. The fundamental principle of the grit-blasting process is the removal of rust, mill scale or other surface contaminants (and obtaining a suitably roughened surface) by projecting a highly concentrated stream of relatively small abrasive particles at high velocity against the surface to be cleaned. The surface is abraded through the high velocity impact of abrasive particles. In preparing steel surfaces for painting by blast

cleaning rust, mill scale and old paint are removed along with some of the base metal.

The blasting of the steel surface needs to be carried out with sharp/edged cast iron or mineral blasting material. The tolerances of the blasted steel surface need to correspond to the comparison sample of standard G 201 segment 2 lower - 3 medium. The cleanliness and roughness of the blasted surfaces needs to correspond to ISO 8503-1 and 8503-2:

Cleanliness: minimum SA 2½ (ISO 8501-1:2007)

Profile: R<sub>z</sub> 50-70 (maximum R<sub>max</sub> 100um and peak amount P<sub>c</sub>10 um of 20 measured with Perthometer (Mahr)

The required surface roughness of substrate prior to the first primer application must be measured using surface roughness measuring equipment (e.g. a comparator) or by measuring the roughness (EN ISO 3274 and EN ISO 5436-1 and 2).

Please refer to "Application Guidelines of Jotun Powder Coatings for Steel Substrates" for further details.

### **Relative Humidity**

During blast cleaning, high humidity (moisture) can result in rapid deterioration of the cleaned surface. Final dry abrasive blasting should not be performed in wet or damp conditions (i.e. when raining, or when the relative humidity is very high - generally greater than 90%).

The steel after blasting must be maintained at least 3°C (5°F) above dew point.

If abrasive blasting is performed when environmental conditions are close to the dew point temperature, condensation is likely to occur which may result in flash rusting.

### **Time Limits before Coating**

To reduce the risk of deterioration of prepared surface the coating should be applied immediately after completion of the preparation activity or before any visible deterioration of the surface.

If surface discoloration is seen, the surface should be re-blasted. After blasting operations an additional chemical pretreatment (Fe-phosphating, Zn-phosphating or equivalent) can be applied per recommendation of the pretreatment supplier.

### 5.2.2 Sweep blasting on hot dipped galvanized substrates

The outer layer of pure zinc requires very little impact or scouring action to promote adequate surface roughness.

The blasting process should lightly roughen the surface without removing a significant amount of the galvanized coating and provide a key to promote adhesion of the paint film. The procedure should be carried out using the following criteria:

- A fine, non-metallic abrasive (e.g. soft mineral sands with Mohr hardness of < 5)
- Abrasive size which will pass through a test sieve of nominal aperture size 150µm - 180µm
- Blast pressure < 275kPa (40psi)
- Angle of blasting to surface @ 30-60°
- Distance from surface 350 – 400 mm
- Nozzle orifice diameter 10 – 13 mm of venture-type

These controls will ensure that the severity of blasting does not damage the galvanized surface and should remove only 10µm of surface zinc.

## 5.3 Pre-treatment

### 5.3.1 Iron Phosphate and Zinc Phosphate

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

- a) Degreasing
- b) Rinse
- c) Rinse (possibly activation)
- d) Rinse
- e) Phosphating
- f) Rinse
- g) Rinse (possibly with passivation), using demineralized water (the last running water from the object should be tested at 20°C. The readings should be below 30 µSiemens/cm).

The chemical deposition of the phosphate conversion layer should be as per supplier's recommendation.

### 5.3.2 Chrome pre-treatment

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

- h) Degreasing
- i) Rinse
- j) Acid wash
- k) Rinse
- l) Chromating
- m) Rinse
- n) 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 conductivity readings should be below 30  $\mu$ Siemens/cm)

### 5.3.3. Chrome-free or nano-technology pretreatment

Suitable chrome-free or nano-technology pretreatments are also recommended. Due to the variety of chrome-free pretreatments available only those approved by Qualicoat and GSB should be used.

Detailed advice should be sought from the pretreatment supplier.

## 6.0 Drying

Pre-treated ferrous components should be dried in an oven. It is recommended that the maximum object temperatures in the drying oven is < 100°C. However, it is always advisable to follow and perform the process as per chemical supplier's written instructions.

## 7.0 Primax Protect application

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

Pre-treated ferrous 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 16 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 75 microns and a maximum of 120 microns.

Primax Protect shows a good chargeability during the corona application. It is recommended to start the corona application of 60 KV and 20  $\mu$ A on the application current. Spraying application parameters may be adjusted to achieve the final coating requirements.

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 20%.

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

## 8.0 Partial curing

Sprayed powder coating must be partially (or green) cured (i.e. gelled) as specified by Jotun Powder Coatings for Primax Protect (see the relevant TDS).

Oven tracking test (using the same thickness of substrates to be coated) should be initially conducted prior to any continuous production. And adjustment shall be made if required. At any given point in time, the metal /object temperature inside the curing oven should be  $\leq 200^{\circ}\text{C}$  but  $>160^{\circ}\text{C}$ . Failure to adhere to this temperature range may affect the inter-coat adhesion between Primax Protect and the top coat.

The most suitable partial cure time of Primax Protect at temperature selected from the given range is recommended to be defined by a practical experiment. That will help to secure the best decorative and functional performance, considering differences in coated objects and curing ovens.

It is also recommended to conduct an oven test, once a week. E.g. proper adjustment/correction can be made, if required. 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  $\pm 10^{\circ}\text{C}$ .

## 9.0 Jotun top coat application

The primed substrates should never be handled with bare hands. Failure to do so may affect the inter-coat adhesion between the Primax Protect and the Jotun top coat.

The application of the selected Jotun top coat must take place no later than 12 hours at the same site after the application of this product. The shortest possible interval is recommended.

If the primed substrates are going to be temporarily stored, then the primed substrates, shall be stored away from sunlight, covered with a clean and clear plastic sheet, in a dust-free, cool and dry place.

Before the application of a Jotun top coat, it is always advisable to check if the primed substrates are free from any mechanical damage and should be cleaned using a clean, oil/water free compressed air. The inter-coat adhesion properties and the complete system cure must always be verified.

Jotun top coat (e.g. Jotun Facade), have good chargeability during the corona and tribo application. It is recommended to start the corona application of 60 KV and 15  $\mu$ A on the application current. Spraying application parameters may be adjusted to achieve the final coating requirements.

A single coat application of Jotun top coats should be undertaken in one operation, to a minimum film thickness of 60 microns and a maximum of 90 microns.

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%.

## 10.0 Curing of the coating system

The selected Jotun top coat and primer (i.e. coating system) shall be cured in accordance to the recommended curing schedules of the selected Jotun top coat. Please refer to relevant curing schedules specified by Jotun top coat TDS.

The primed and top coated substrates should be cured in a convection oven. Oven tracking test (using the same thickness of substrates to be coated) should be initially conducted prior to any continuous production. And adjustment shall be made if required. The air temperature in the curing zone shall not deviate from the adjusted nominal temperature by more than  $\pm 10^{\circ}\text{C}$ .

Failure to adhere to this temperature range may cause inferior mechanical and corrosion protection properties.

It is also recommended to conduct an oven test once a week. E.g. proper adjustment/correction can be made, if required. The temperature is best obtained by measuring it at the thickest wall of the object, while the oven is fully loaded.

### **10.1 Post Cure Handling**

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

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

### **11.0 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 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 after the curing process include, but not limited to, film thickness, visual color assessment, adhesion and other mechanical properties and physical appearance of the coating. Cure test can be carried out using the MEK (Methyl Ethyl Ketone) test.

### **12.0 Packing**

Special care must be taken when loading and unloading the coated components and objects.

To prevent any damage during transportation each coated object, or component, should be packed individually and isolated from other objects or components by crepe paper, with a weight of 150 grams/m<sup>2</sup>, or other suitable cellulose based packaging. Additionally, polyolefin packaging can also be used. For example, LDPE plastic packaging can be used provided that the thickness of the foil is >60 microns and has a coefficient of friction of <0.25 and has a minimum melting point of >120°C.

It is the responsibility of the powder coating applicator to quality assure the use of any packaging materials prior to any use.

If coated ferrous components are wrapped with any plastic sheet, these coated ferrous components must not be subjected to high heat (>70°C) or high humidity (>80%) or direct sunlight.

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

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

### 13.0 Repair procedures

It is probable that during fabrication, erection and installation there are on site activities like cutting, fixing of nuts/bolts, handling and movement of steel structures. These activities can result in physical damage to the coating. In order, to repair the coating the following procedure is recommended.

- Complete cleaning of damaged area
- Surface preparation prior to application of liquid touch up paint
- Application of Jotun Paints' 2 component surface tolerant Jotamastic 90 by brush (depending on the damage) with a dry film thickness (DFT) of 75 - 100 microns and allowing it to 'dry to over coat' for a minimum of 3 hours @ 25 °C
- Followed by two coats of Jotun Paints' top coat, 2-component HardTop XP or XPL (depending on the gloss levels) @ DFT of 20 - 25 microns per coat.
- The repaired coating system should then be dried / cured for service for 7 days @ 25 °C. Dried / cured for service is the minimum time before the coating can be permanently exposed to the intended environment / medium.

Detailed repair procedure can be found on "Touch Up and Repair Procedure for Damaged Powder Coated Substrates Using Jotun Jotamastic 90 and Hardtop XP and XPL". Your Jotun representative should be contacted if clarifications are needed. Additionally, your Jotun representative should be contacted to secure the nearest shade in Hardtop matching the powder coating. The gloss/shade may differ slightly between powder and liquid coats.

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. June 2019

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