

Surface Pre-treatments & Primers

Metal Preparation method and recommendations

WHAT IS SURFACE PRE-TREATMENT?

Surface pre-treatment includes the necessary steps that precede the application of a Rilsan® powder coating on the substrate to be protected. The purpose of the pre-treatment stage is twofold. First, it eliminates all impurities from the surface prior to coating. Second, one or more protective undercoats can be applied to obtain a high-quality coating and achieve optimum performance. The lifetime of the protective coating very much depends on the quality of the preliminary surface treatment. The nature and shape of the metal part, as well as the conditions (thermal, chemical and atmospheric environments) to which the parts will be subjected, are the main factors that should guide coaters in choosing the most suitable, surface treatment, i.e. mechanical or chemical. Two types of products are available for use as primers for Rilsan® coatings: Rilprim® and Primgreen® liquid primers.

PRE-TREATMENT PROCESS

DEGREASING

This essential step is designed to eliminate fatty substances that build up on the surface during the manufacturing of the metal part. It requires the use of alkaline, neutral or acidic products (depending on the nature of the grease to be eliminated, and the nature of the metal) that may be applied by spraying or dipping. More universal solventbased solutions (trichloroethylene, perchloroethylene) may also be used. In order to eliminate grease from large steel (or ferrous alloy) parts, high temperature pyrolysis can be utilized when the metal structure allows it. In other cases, the coater may use manual cleaning if it is more appropriate. A visual examination will help confirm the absence of grease or pollution on the surface of the part.

STRIPPING / GRIT-BLASTING

This stage follows the degreasing step and eliminates all foreign bodies (e.g. carbon impurities or metal oxides) present on the surface of the part. Once the surface is free of oil and grease, the following process may be carried out:

- **Mechanical etching**

Involves blasting the part surface with an abrasive medium. Type G17 angular shaped iron grit or corundum is recommended for ferrous metals, and corundum for aluminium alloys. The blasting air should be dry and free of oil. Once the part has been grit-blasted, it should be coated without delay (generally within 8 h), or it may be kept dry temporarily...to prevent the formation of oxides on the surface. Should signs of surface corrosion appear, the grit-blasting stage must be repeated before the coating is applied.

- **Chemical etching**

Involves immersion or spraying the part with strong acidic solutions (sulphuric, hydrochloric or phosphoric acid), followed by consecutive rinsing and drying in stable and controlled chemical baths. Other types of chemical treatment (e.g. electroplating, phosphating, chromating, etc.) may be used as long as they are compatible with the Rilsan® PA11 coating and its application process.

- **Specifications**

After surface preparation, the degree of cleanliness shall be at least Sa 21/2 as defined in EN ISO 8501-1 and shall have a roughness Rz measured according to EN ISO 4287 between 40 µm and 90 µm, when Rilsan® powders are applied by dip-coating, and from 20 µm to 40 µm when Rilsan® powders are applied by electrostatic spray. The surface roughness may need to be adjusted to achieve properties required in certain applications.

PRIMER APPLICATION

The primer undercoat creates a chemical bond producing strong adhesion between the substrate and Rilsan® coating. It also ensures durable protection against corrosion should the coating be damaged. Arkema markets a range of solvent-based (Rilprim®) and water-based (Primgreen®) liquid primers. Primgreen® primers have low volatile organic compounds (VOC) content, are particularly environmentally sound, and are very easy to use. When handling Arkema primers, users are advised to refer to the product's safety datasheet and current regulations on the use of liquid coatings.

PRIMERS FOR FLUID BED POWDER PROCESS

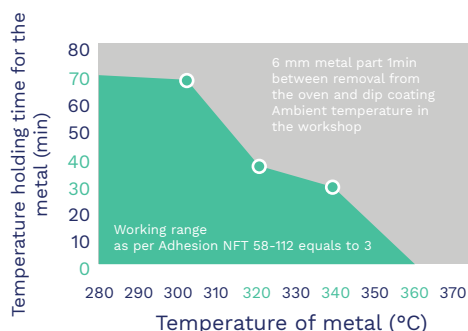
Primgreen® LAT 12035 is a one-component product that can be applied by spray-gun using a traditional spraying technique (compressed air or electrostatic). Under normal temperature and moisture conditions, the viscosity of LAT12035 is such that the product does not need to be diluted. Liquid dip-coating is also possible: in this case, the product should be diluted with a water/butyl glycol (3:1) blend to achieve a 70/30 product/diluting blend ratio by volume prior to application. Due to the sensitiveness of the method, please contact Arkema's Technical Service for more information.

It is necessary to apply, a continuous and consistently thick film (8 to 12 µm cured film corresponding to 100-150 µm wet film for pneumatic spraying) without obtaining drips, over the entire surface. Consult the primer datasheet to ensure that the proper drying time is observed before it is cured in an oven. These factors and the preheating parameters of the part, determine the quality of the primer's curing (characterized by a brown color after curing), and conditions the quality of the Rilsan® coating's final properties.

The curing conditions (time/temperature) necessary to achieve optimum adhesion depend on the nature and thickness of the part. These conditions should be determined by the coater for every type of part based on the equipment available.

The chart on the right indicates the optimum range of use for Primgreen® LAT 12035 on a 6 mm thick metal part. This range is a function of the preheating and oven temperature and time parameters. Adhesion properties exceeding or equal to 3 as per standard NFT 58-112 are found in the area colored in green.

Primgreen® LAT12035 is recommended for application in contact with water below 50°C. For higher temperatures, Rilprim® P23V40 may be used. For more information, please contact Arkema's Technical Service.



PRIMERS FOR ELECTROSTATIC SPRAY POWDER PROCESS

Rilprim® LES201/104B is suitable for application by traditional or electrostatic spraying. This solvent-based, two-component product consists of a resin (Rilprim® LES201) and its dilutant (Rilprim® 104B) mixed in 50/50 proportions by volume. Applied in a thin coat (5 to 8 µm dry film), this primer undercoat is compatible with Rilsan® powders applied by electrostatic spray. The curing of the primer occurs during the melting phase of Rilsan® ES or ESY powders. Rilprim® LES201 is a Cr+6 free formulation. It helps produce excellent anticorrosion properties (no loss of adhesion and no corrosion creep after 2000 h exposure to a salt spray or 2000 h in boiling water). This product is recommended for the most demanding applications on steel but is not recommended on non-ferrous substrates where Primgreen® LAT12035 is recommended.

CHOOSING THE RIGHT PRIMER UNDERCOAT

The choice of the right undercoat depends on the nature of the substrate to be protected (e.g. steel, various casts, stainless steel, aluminum), the level of performance sought, and the process selected to apply the Rilsan® PA11 powder. If you require further information, please contact our technical support team and they will be pleased to assist you with choosing the right product. Undercoats other than Rilprim® and Primgreen® may be suitable and meet the necessary specifications. Such products should be evaluated beforehand. Only Rilprim® and Primgreen® primers are marketed and recommended by Arkema and undergo systematic performance testing so that our customers may be assured of a top-quality product.

MAIN APPLICATION DEFECTS AND THEIR POSSIBLE CAUSES

Defect	Primer	Cause
Poor wetting	Primgreen® LAT 12035	<ul style="list-style-type: none"> Part too greasy
Rust on the part («flash rust»)	Primgreen® LAT 12035	<ul style="list-style-type: none"> Primer coating too thick Insufficient air extraction from the booth Temperature of metal too low Ambient temperature too low Ambient humidity too high Drying time too long
Uneven film	All primers	<ul style="list-style-type: none"> Presence of dust on the surface
Drops and runs	All primers	<ul style="list-style-type: none"> Too much primer Bubbles
Bubbles		<ul style="list-style-type: none"> Product not stirred properly Too low primer thickness
Poor adhesion		<ul style="list-style-type: none"> Bad substrate preparation Pre-heating conditions not suitable

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