RILSAN®
FINE POWDERS
BY ARKEMA

ELECTROSTATIC SPRAYING PROCESS /

Rilsan® coating application methods and recommendations

PRINCIPLE OF THE PROCESS

Electrostatic spray coating consists of depositing electrically charged powder particles on the surface of the metal to be coated at ambient temperature. The electrostatic charge is obtained by conveying the powder through a spraying device (such as "corona" or "tribo" spray-guns).

The charged powder particles are attracted to the grounded part to be coated.

The powder coated part is then moved into an oven where the Rilsan® powder fuses to produce a smooth and non-porous coating.

Two series of Rilsan® grades are suitable for this application process: the **Rilsan® ES** and **Rilsan® ESY** ranges.

CRITERIA FOR CHOOSING THIS PROCESS

This process is of special interest in operations where the thickness of the coating has to be below 150 µm. Furthermore, the electrostatic spraying technique makes it easier to produce objects with masked (uncoated) areas and can be completely automated.

The choice of this process depends on the following criteria:

- **Thickness of the part**
  The process is perfectly suited for coating parts that are up to 6 mm thick.
- **Thickness of coating**
  The process allows controlled thickness ranging from 80 to 120 µm (Rilsan® ESY grades), and from 100 to 150 µm (Rilsan® ES grades).
- **Size of part**
  There are no limits to the dimensions of the part to be coated; partial coating is possible.
- **Nature of part - surface treatment**
  The process is suitable for all types of conductive metal substrates capable of withstanding a temperature of 220°C without deterioration.

OPERATING CONDITIONS

SURFACE TREATMENT / PRIMER

When handling Rilsan® Fine Powders, users are advised to refer to the product's safety datasheet and current regulations on the use of powder coatings. The parts to be coated should be clean, and free of grease or oil. The primer promotes the adhesion of Rilsan® onto the surface of the metal to be protected. For both ES and ESY grades, the primer is required to achieve anticorrosion performance as well as excellent resistance to hot water.

For ES grades, it is also recommended to apply a primer also to prevent electrostatic discharge and the powder falling off during fusion. For further information, please refer to the leaflet on *Surface pre-treatments and primers*.

POWDER APPLICATION

- **Spraying**

Rilsan® ES grades require the use of spraying equipment either of the corona type (positive polarity recommended) or the tribo type. For corona spraying, polarity from 30 to 40 kV, intensity of 20 µA and a flow rate of 120 g/min is advised. The same flow rate should be targeted with tribo type spraying equipment. Note that these parameters should be optimized on specific equipment.

Rilsan® ESY grades should only be applied using the corona process with negative polarity. Advised polarity is -30 to -70 kV, while keeping the intensity and flow rate the same as for ES grades.

It is possible to recycle overspray Rilsan® ES powder and to blend it with virgin powder in proportions which should be held constant after sieving and removing its electrical charge. It is not recommended to recycle Rilsan® ESY powders. However, production trials may be carried out to establish recycling feasibility.

It is necessary to ensure that both the coating equipment and the work environment are clean in order to minimize pollution from dust or other coating materials.

Ideal conditions for the electrostatic spray process are a temperature of 20°C ± 5°C and air humidity close to 50%.

When handling the product, users are advised to refer to the product's safety datasheet and current regulations on the use of powder coatings.

FUSION

- **Oven type**

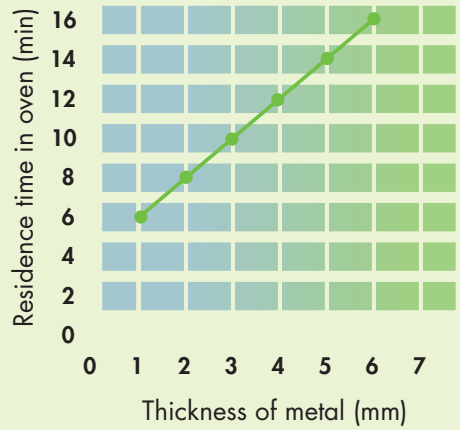
Fusion should occur in a temperature-controlled oven (homogeneous temperature throughout) with good ventilation (air speed typically below 3 m/sec) in order to prevent air blowing too fast around the coated parts. Tunnel type ovens are most suitable for continuous processing.

- **Fusion temperature / time**

Unlike thermoset powders, Rilsan® powders do not crosslink: surface temperatures of 215°C +/- 5°C allow the powder to melt, and the coating properties are reached as soon as the film formation is achieved.

The time needed to melt the powder and cool the coating depends on the thickness and configuration of the part.

For a smooth, cold-rolled steel part, the residence time in an oven at 215°C required to melt a Rilsan® coating is shown on the following graph, as an indication.



OTHER PROCESS

HOT SPRAYING

The hot spraying process consists of spraying a pre-heated part with Rilsan® powder. As soon as the powder impacts the preheated article it melts to form a film on the surface. When hot spraying, the Rilsan® T/FB range is recommended for coatings of 250 µm to 600 µm, but only for parts with a sufficient thickness (min 3 mm). Rilsan® ES and ESY ranges can be used if the desired thickness is lower than 200 µm and if the thickness of the part is not too high (6 mm max).

The surface preparation and pre-heating of the part is equivalent to the process used for fluidized bed dipping: degreasing, sand or grit-blasting, priming, pre-heating and coating. The powder can be sprayed using conventional electrostatic powder guns as long as the charge is turned off. Note that it is critical to adjust oven time and temperature to ensure proper curing of the primer and maintain sufficient pre-heating of the part. For more information, please refer to the leaflets on *Fluidized bed dipping process and Surface pre-trearments and primers.*

MAIN APPLICATION DEFECTS AND POSSIBLE CAUSE

DEFECT	CAUSE
Bubbles	• Too much powder applied • Excessive humidity of powder or coating equipment air supply • Degassing of part support • Too much primer applied • Oven temperature too high
Orange peel	• Fusion time or temperature too low • Distance between spray-gun and part too short • Application voltage or intensity too high • Ambient temperature too low
Pinholes	• Coating thickness too small (too low powder flow or insufficient spraying time) • Unclean part surface
Frosting or unmelted powder	• Fusion time too short or • Fusion temperature too low
Yellowing	• Fusion time too high or • Fusion temperature too long
Poor adhesion	• Inadequate preparation of the surface • Too little or too much primer • Inadequate fusion temperature and/or time
Powder fall-off	• Too much powder • Oven ventilation too strong • Too little primer • Application voltage too low
Craters / Inclusions	• Cross-contamination from dust or other coating material in spray equipment or oven

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ARKEMA
INNOVATIVE CHEMISTRY

rilsanfinepowders.com
info.rfp@arkema.com

Headquarters: Arkema France
420, rue d'Estienne d'Orves
92705 Colombes Cedex – France
Tel.: 33 (0)1 49 00 80 80
Fax: 33 (0)1 49 00 83 96
arkema.com