Electrostatic spraying of Rilsan® Fine Powders

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 blowing 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, ES grades requiring the prior application of a suitable adhesion undercoat (primer).

CRITERIA FOR CHOOSING THIS PROCESS

The electrostatic coating process gives flexibility to the coater. The process can be automated for high speed, coating thickness is easy to regulate, and masking sections of parts, so they are not coated, is no problem. The choice of this process depends on the following criteria:

Thickness of the part:

the process is perfectly suited for coating thin parts as well as parts as thick as 6 mm.

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 is no limit 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

The parts to be coated should be clean, and free of grease or oil.
For further information, please refer to the Technical Datasheet on "Surface Treatments and Primers compatible with Rilsan® PA11 coatings".

Primer

For Rilsan® ES grades, it is recommended to apply a primer to prevent electrostatic discharge and the powder falling off during fusion. The primer promotes the adhesion of Rilsan® onto the surface of the metal to be protected, and helps achieve outstanding anticorrosion performance as well as excellent resistance to hot water.

For further information, please refer to the Technical Datasheet on "Surface Treatments and Primers compatible with Rilsan® PA11 coatings".

Powder spraying

• Equipment type

Rilsan® ES grades require the use of spraying equipment either of the corona type with positive polarity (from + 30 to + 40 kV) or the tribo type. Rilsan® ESY grades should only be applied using the corona process with negative polarity (from - 30 to - 70 kV).

It is possible to recover the fraction of Rilsan® ES powder that has not coated the component, and to blend it with virgin powder after sieving and removing its electrical charge. It is not advisable to recycle Rilsan® ESY powders if optimum quality is required from the product. However, production trials may be carried out to establish recycling feasibility.

• Powder spraying environment

The formulation of Rilsan® powders makes them insensitive to pollution craters. However, it is necessary to ensure that both the coating equipment and the work environment are clean in order to minimize pollution from dusts generated during the coating process.
Ideal conditions for electrostatic spray coating using Rilsan® powders include temperatures ranging from 20°C +/- 5°C and air humidity levels close to 50%.

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

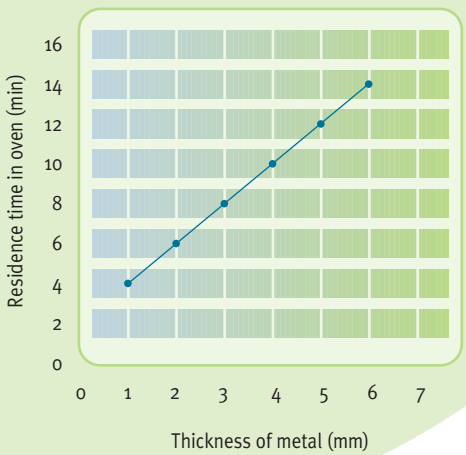
Fusion

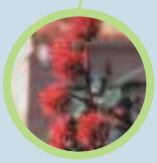
•Oven type

Fusion should occur in a perfectly temperature-controlled oven (homogeneous temperature throughout) with good ventilation (air speed typically below 3m/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

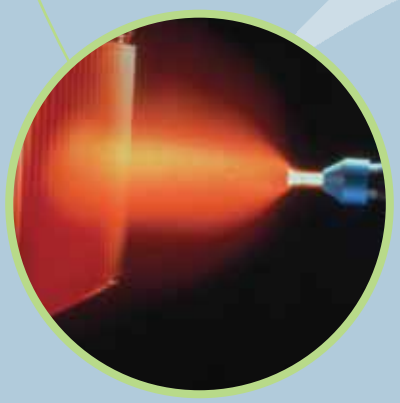
Unlike thermoset powders, Rilsan® powders do not crosslink: surface temperatures of **215°C +/- 5°C** allow PA11 thermoplastic to melt, and the products' properties are reached as soon as the film formation is achieved. The time needed to melt the powder and cool the coating depends on the thickness and configuration of the part.
For a smooth ZES steel part, the residence time in the oven needed to melt a Rilsan® coating is shown on the following graph, as an indication:





RILSAN® ES: MAIN APPLICATION DEFECTS AND THEIR POSSIBLE CAUSES

Nature	Cause
Bubbles	• Too much powder applied • Excessive humidity of powder or coating equipment air supply • Degassing of 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 tension too high • Ambient temperature too low
Pinholes	• Coating thickness too small (too low powder flow or insufficient spraying time) • Support not clean enough
Frosted or unmelted powder	• Fusion time too short or fusion temperature too low
Yellowing	• Fusion temperature too high or fusion time too long
Poor adhesion	• Inadequate preparation of the surface • Too little or too much primer • Inadequate baking temperature and/or time
Adhesion failure	• Inadequate preparation of the surface • Too much powder • Oven ventilation too strong • Too little primer • Application tension too low



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