

IGP fluoropolymer coating powder

Processing of fluoropolymer-based IGP coating powders

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A DOLD GROUP Company

Introduction

Compared to polyester powder coatings, there are additional processing requirements that must be observed when applying fluoropolymer-based powder coatings from the **IGP-DURA[®]sky 9503** series. When powder coatings are formulated with a binding agent containing a high proportion of fluoropolymer, there are a few important points that must be observed, particularly as regards the charging of the coating powder, the flow properties, and achieving satisfactory opacity. These are explained below.

Processing guideline VR 206 applies to both solid and effect shades. Powder coatings from the 95 series that contain effects are categorized into three IGP processing classes, ranging from 2 STARS** to 4 STARS****.

The stars on the label of your powder coating container indicate the processing class of your product.

Opacity

For ultra-durable façade products with a high proportion of fluoropolymer resin, a primer with a color-homogenizing effect is required in the light color range due to the structure of the binding agent. If extremely light products are being applied, use of the matching primer IGP-KORROPRIMER 6007A90164A01 is obligatory.

Always consult the specific technical data sheet for the primer. When using IGP-KORROPRIMER 60, it is also essential to follow processing guideline VR211. Darker and/or brightly pigmented product types, as well as effect coatings from product group **IGP-DURA[®]sky 9503**, offer very good opacity from 60 µm and do not require a primer.

If a base coat of primer is applied underneath, it is advisable to use an ion-leakage ring when applying the top coat. Alternatively, the voltage kV and current µA can be reduced.

Order organization

To minimize color and effect variations when coating different parts belonging to the same order, you should determine the quantity of powder required for the entire order and add a contingency amount. This quantity should then be ordered so that all the coating work can be completed using a single prepared batch.

Coating equipment

Experience has shown that varying results in terms of shade and effect formation can occur when the product is applied using devices from different manufacturers.

Electrostatic parameters – such as the level of the high voltage applied, the current limiting setting (µA), the utilization of ion-leakage rings, and

the processing of effect powder coatings with opposite polarity – significantly impact the shade and effect formation.

Another influencing factor is the coating booth. Unlike steel cabins, cabins made of synthetic material and glass prevent the dissipation of electrostatic charge because of the insulating cabin walls. This produces different coating results with regard to shade and effect formation. For this reason, please avoid using different cabin types to process the same order. Do not make any changes to the processing or application parameters of the coating plant when processing a single consignment. Once you have identified the optimum plant data/application parameters, document and observe these without fail.

Processing

Adhere to the recommended coating thickness:

When processing from the product group **IGP-DURA[®]sky 9503**, it is absolutely essential to adhere to the recommended minimum coating thicknesses of 60 to 70 µm (middle) or 70 to max. 85 µm (edge area). This has a positive impact in terms of flow quality, reducing the picture frame effect, and suppressing spray-back effects.

To minimize powder wrap-around in the edge area, a sacrificial sheet or profile can be suspended (along with the part) in the lower and upper areas of the product carrier if necessary.

Even with straightforward geometries, such as rectangular profiles or sheets, current limiting is required in the case of a medium voltage (see table) without use of a corona ion-leakage ring.

Current and voltage parameters for solid shades: With a customary voltage of 70 kV, the current should be limited to approximately 10–20 µA.

Current and voltage parameters for effect shades: With a customary voltage of 80 kV, the current should be limited about 50 µA or smaller.

Any manual application that is necessary in semi-automatic operation should always be executed as a preliminary coat.

Pure manual coating is likely to result in shade and effect fluctuations, as well as cloud formation, due to the uneven application of powder. Therefore, manual coating must always be aligned with the results of automatic coating. When dealing with objects to be coated on both sides (e.g., profile sections), the side that will be primarily visible should be coated last.

When processing coating powder with pearl mica effect, you should always use corona guns with a negative electrostatic charge without using any ion-leakage rings.

Depending on the product, the spraying distances between the object and the gun vary between 280 and 350 mm.

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Reclaim

Powder facilities equipped with a cyclone reclaim system do not separate out the finest powder grains and effect particles in the cyclone. Instead, these particles are continuously removed from the powder. This removal alters the ratio of the effect particles to the basic shade.

The only way to completely avoid shade changes due to effect losses during coating is to carry out the processing of effect powder coatings without reclaiming any of the surplus powder at all.

In the case of automatic coating, it is possible – assuming that the batch size allows for this – to add a certain quantity of reclaimed powder, depending on the IGP shade classification. For details, please see the table at the end of this document.

In this case, we recommend that you prepare limit samples prior to the start of production and use them throughout the entire production process in order to check the shade and effect. If the shade and effect deviate, increase the ratio of fresh powder as required.

When using effect powders, it is advisable to feed some of the powder that has been prepared for the order through the reclaim system before production actually starts. This ensures a stable mix of fresh and reclaimed powder from the moment the first object is coated.

Plant maintenance and cleaning

To ensure the coating plant achieves the same coating results time after time, the entire plant must undergo the maintenance work recommended by the manufacturer at the specified intervals. This involves replacing parts subject to wear. Various functional tests, e.g., checking the high voltage, must be carried out at regular intervals.

Grounding

When processing **IGP-DURA[®]sky 9503**, particularly on substrates that have already been coated (primed), care must be taken to ensure that the hanger is adequately grounded.

Suspension of the parts

The suspension of the parts (horizontal or vertical) must be determined prior to coating. The intermediate spacing between the coating objects within the hangers as well as the spaces between the hangers must be kept as small and regular as possible. If there are large distances between the hangers, it is advisable to have the guns switched on and off automatically via a parts detection system.

Furthermore, care must be taken to ensure that parts are coated together in groups whose members are as similar as possible.

Curing

Different curing temperatures and heating speeds of the parts must be avoided. Product carriers whose objects involve a mixture of materials or whose parts have the same substrates but different material thicknesses should not be coated together because of the differences in heating behavior. It is absolutely essential to observe the recommended curing window along with the object temperatures specified in each case.

Other applicable documents

Technical data sheets:

- TI 106, cleaning recommendation for IGP coating powder with pearl mica effect
- TI 000, classification of effect powder coatings

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Recommendations for processing IGP fluoropolymers from product group 9503

The values stated here are recommended values. When processing pearl mica products, you must adjust the processing parameters of the coating plant to the product to be processed.

Plants and/or processing parameters (devices / accessories)	Setting (parameter) for top coat 9503 according to shade or effect classification (*-****)					Possible effects on (comment)
	Solid-color	Solid color with primer	****	***	**	
High-voltage setting kV	60 – 70	70 – 80	70 - 80	70 – 80	70 – 80	charging / sprayback
Current limit μA (gun)	10–20 μA	$\leq 50 \mu\text{A}$	$\leq 50 \mu\text{A}$	$\leq 50 \mu\text{A}$	$\leq 50 \mu\text{A}$	edge greasing
Total air flow m ³ /h / conveying + dosing air (inner diameter of powder hose)	12 mm = 5 m ³ /h 11 mm = 4 m ³ /h 10 mm = 3 m ³ /h		12 mm = 5 m ³ /h 11 mm = 4 m ³ /h 10 mm = 3 m ³ /h			prevents pulsing of the powder cloud, ensures optimal atomization.
POE powder hose with integrated grounding (injector gun)	ground the injector					prevents electrostatic charging of the powder in the powder hose
Nozzle (pistol) with flat spray nozzle	suitable					even atomization
Nozzle (pistol) with or without-baffle plate	suitable					reduced depth effect
Processing with ion-leakage ring (pistol)	without	with	without			reduces spray-back effects
Spraying distance of coating (gun to part)	max. 280 mm	max. 300 mm	max. 350 mm			even coating, reduces streak and cloud formation
Coating with tribo guns (guns)	not recommended					IGP recommendation: do not process IGP-DURA [®] xal with tribo.
Powder feeding with injector and fluidizing container	highly suitable, fluidizing air as required					even powder feeding and powder cloud
Powder feeding with injector from the supply container	suitable under certain condition					partly slightly irregular feed. Risk of cloud formation.
Screening with US screen (screening machine)	suitable for mesh size >140 μm					better fluidization, more even application

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Plants and/or processing parameters (devices / accessories)	Setting (parameter) for top coat 9503 according to shade or effect classification (*_****)					Possible effect (comment)
	Solid color	Solid color with primer	****	***	**	
Maximum share of reclaimed powder in circular operation without checking the shade	no restriction		≤ 10%	≤ 5%	≤ 0%	prevents shade deviations during coating
Maximum share of Premium Bond reclaimed powder in circular operation with pre-checking of the shade	no restriction		≤ 30%	≤ 25%	≤ 20%	prevents shade deviations during coating
Document processing parameters (control unit program)	recommended		recommended	recommended	strongly recommended	facilitates reproducibility of the coating results
Produce limit sample first	not compulsory	not compulsory	recommended	strongly recommended	strongly recommended	prevents subsequent complaints due to excessive shade deviations
Coating on various coating plants	possible	possible	possible after comparison	possible after comparison	possible under certain conditions after comparison	different coating plants can sometimes cause the effect characteristics to deviate
Manual pre-coating of the parts in semi-automatic operation	possible	possible	recommended	recommended	strongly recommended	increased tendency toward color deviations and streak or cloud formation
Pure manual coating	possible	possible	not recommended	not recommended	not recommended	uneven coating can result in the coating thickness being exceeded
Manual hand coating	possible	possible	not recommended	not recommended	not recommended	increased tendency toward color deviations and streak or cloud formation