

Processing guideline

VR206 – IGP fluoropolymer coating

Introduction

Application of fluoropolymer-based powder coatings from the IGP-DURA[®]sky 95 series places additional demands on Processing compared to polyester powder coatings.

For powder coatings formulated on a binder content with a high fluoropolymer content, there are a few important special features to consider, particularly with regard to the charging of the coating powder, the flow and the satisfactory hiding power of the powder coating, which are explained below. Three IGP processing classes from 2-STAR^{**} to 4-STAR^{****} are distinguished for the effect-containing powder coatings of the 95 series. You can recognise the processing category of your product by the stars on the container label of your powder coating.

Covering capacity

Ultra-durable façade products with a high proportion of fluoropolymer resin components require a primer with a colour-homogenising effect due to the binder structure in the light colour range.

The use of the primer IGP-KORROPRIMER 6007A is mandatory for the application of heavily lightened products. Our sales staff or technical service will assist you in selecting a matching shade.

Order organisation

In order to minimise differences in colour and effect when coating different workpieces in one job, the amount of powder required for coating the entire job plus a reserve quantity should be determined and ordered in order to coat all coating services with one manufactured batch.

The use of the primer IGP-KORROPRIMER 6007A is mandatory for the application of heavily lightened products. The relevant technical data sheet for the primer must be consulted. For IGP-KORROPRIMER 60, the processing guideline VR211 must also be observed. Darker and/or colour-pigmented product variants and effect coatings from the IGP-DURA[®]sky 9503 product group cover very well from 60 µm and do not require a primer.

Coating devices

Experience has shown that Application with devices from different manufacturers can produce different results in terms of shade and effect formation.

Electrostatic parameters such as the level of the set high voltage, the setting of the current limiter (µA), the use of ion-leakage rings and the processing of effect powder coatings with opposite polarity have a significant influence on the shade and effect formation.

The coating booth is another influencing factor. In contrast to steel booths, plastic and glass booths prevent the flow of electrostatic charge through insulating booth walls. This results in different coating results in terms of shade and effect formation. It is therefore advisable to avoid processing the same job on different types of booths.

When processing a specific commission, no changes may be made to the processing or application parameters on the coating plants. Once system data or application parameters have been determined to be optimal, they must be documented and adhered to.

Processing

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When coating, great attention must be paid to adhering to the recommended Film thicknesses of between 60-80 μ m (also in the edge area). This has a positive effect on the quality of the flow, the reduction of the picture frame effect and the suppression of spray-back effects. In order to achieve optimum layer thickness distribution with low edge greasing, high voltage settings between 50-70kV and a current limiter $<10\mu$ A are recommended. If a current limiter of $<10\mu$ A is not possible, ion-leakage rings can also be used for solid colours. Application without ion-leakage rings is recommended for effect shades. In addition to the high voltage, attention should be paid to a "soft" coating cloud. A soft cloud is defined as an adjusted ratio of powder quantity and total air so that the powder cloud exits the spray nozzle without pulsation but does not form a sharp, elongated cloud. With a soft cloud, the electrostatics can apply the powder evenly to the workpiece without covering the edges too much. Further measures within the Application, such as optimising the movement sequences in long-stroke operation using sinusoidal programs, or adjusting the distances between the guns and the stroke height in short-stroke operation, ensure the best possible coating thickness distribution on the workpieces to be coated.

Any manual application required in semi-automatic mode should always be carried out as a pre-coating. With a purely manual coating, fluctuations in shade and effect as well as cloud formation are to be expected due to uneven powder application. The manual coating must therefore always be coordinated with the results of the automatic coating. For objects to be coated on both sides (e.g. profiles), the main visible side should be coated last.

Please refer to the table at the end of the processing guidelines for the recommended spraying distances.

Reclaiming

In principle, IGP fluoropolymer coating powders are very stable in circulation and suitable for processing in reclaiming mode.

The proportion of overspray that is reclaimed via the separation system can lead to an accumulation of fine powder particles (fines) during reclaiming using a filter. When processing IGP fluoropolymer coating powders in reclaiming mode using a cyclone, fine powder particles (fines) are continuously removed from the powder coating. In both cases, there is a shift in the particle distribution. In order to ensure the most consistent particle distribution possible when processing in reclaiming mode, we recommend the continuous addition of fresh powder.

To rule out colour changes due to loss of effect during coating, pearl mica products can only be processed in pure loss operation without reclaiming.

In the case of automatic coating with a corresponding batch size, a certain amount of reclaimed powder can be added depending on the categorisation of the shade. Please refer to the table at the end of the document. In this case, IGP recommends creating limit samples before the start of production and using them throughout production to check the shade and effect. If there is a deviation in shade and effect, the proportion of fresh powder should be increased accordingly.

Maintenance and cleaning of the system

In order to ensure the reproducibility of coating results on the coating system, the maintenance work recommended by the manufacturer to replace wearing parts must be carried out on the entire system at the intervals specified for this purpose. Various functional checks, such as checking the high voltage, must be carried out at regular intervals.

Earthing

When processing IGP-DURA®sky 9503, especially on substrates that have already been coated (primed), ensure that the coat is sufficiently earthing. This measure contributes significantly to an even and consistent surface and effect formation.

Mounting the parts

The mounting of the workpieces must be determined before coating (horizontal or vertical). The distances between the coating objects within the hanger as well as the distances between the hangers should be as small and even as possible. If the distances between the hangers are large, it is advisable to switch the guns on and off automatically via a parts detection system. It is also important to ensure that similar workpieces are coated together wherever possible.

Curing

Different curing temperatures and heating speeds of the parts must be avoided. Product carriers with objects in a material mix or with parts of the same substrates but different material thicknesses should not be coated together for reasons of different heating behaviour. The recommended curing window with the specified object temperatures must be adhered to.

Underburning of the powder coating, as well as different heating behaviour, can lead to deviating gloss values of the surface.

Applicable documents

Technical data sheets:

- TI 106 Cleaning recommendations for IGP coating powders with pearl mica effect
- TI 000 Classification of effect powder coatings

Recommendations for Processing IGP fluoropolymers of product group 9503

The values given here are "recommendations". When processing, the processing parameters of the coating plants must be adapted to the "product" to be processed.

Systems and processing parameters (devices / accessories)	Setting (parameters) according to categorisation (* - ****)				Possible influences on (remark)
	uni	****	***	**	
High voltage setting kV	50 - 70	60 - 70	60 - 70	60 - 70	Charging / spray back (observe actual values)

Current limiter μ A (gun)	< 20 < 10				-> Normal operation -> reduces edge greasing
Total air Nm ³ /h Delivery + dosing air (inner \varnothing powder hose)	12 mm = 5 m ³ /h 11 mm = 4 m ³ /h 10 mm = 3 m ³ /h				Prevents pulsation of the powder cloud / ensure a "soft" cloud
Powder hose with integrated earthing (injector - gun)	Ground the injector				Prevents electrostatic charge in the powder hose
Nozzle (gun) with flat spray nozzles	Suitable				Ensure a "soft" cloud
Nozzle (gun) with baffle plate	suitable				Reduced depth
Processing with ion-leakage ring (gun)	Without recommended / possible with overpainting	Without recommended			Reduced application efficiency when used
Coating spraying distance (gun - workpiece)	>200mm	>300mm	>350mm	Prevents streaking	
Coating with tribo guns	Not suitable				No sufficient charging
Powder feed from fluidised container	Well suited, fluidising air as required				Check fluidisation before coating
Powder delivery from the delivery container	Not recommended				Sometimes slightly irregular conveying and therefore irregular layer thicknesses
Screening with US screen (screening machine)	Recommended with mesh size >140 μ m				Better fluidisation, more even application
Maximum proportion of reclaimed powder in recirculation mode without pre-testing the shade	\leq 90%	\leq 10%	\leq 5%	\leq 0%	Prevents colour deviations during coating operation

Maximum proportion of premium bond reclaimed powder in circulation mode with pre-testing of the shade	Not applicable	≤ 30%	≤ 25%	≤ 20%	Creation of limit samples is strongly recommended	
Document processing parameters (control unit programme)	Recommended	Highly recommended			Facilitates reproducibility of the coating results	
Create limit samples in advance	Recommended	Recommended	Highly recommended			Prevents excessive deviations from being subsequently objected to
Coating on different coating plants	Possible (ensure comparable oven graphs)	Possible after adjustment	Not recommended			Different coating plants sometimes produce different effect characteristics
Manual pre-coating of the workpieces in semi-automatic operation	Possible	Not recommended			Reduces tendency to streaking and colour deviations	
Manual follow-up coating of the workpieces in semi-automatic operation	possible	Not recommended			Increases tendency to streaking and colour deviations	
Manual coating only	Conditionally possible	Not recommended			Ensure even layer thickness distribution	