IGP POWDER COATINGS

Processing guideline

VR207.2 – IGP-DURA®xal L-type

Introduction

IGP-DURA®xal is a deep matte decorative powder coating system, which is available in super durable façade quality as series "4201" (Qualicoat certification class 2) and in weather-proof industrial quality as series "4601", both in UNI or with pearl mica effect.

IGP-DURA®xal effect powder coatings are generally subjected to a further manufacturing process in the IGP bonding process for optimum processing stability, in which the exceptionally fine effect pigments are bonded to the "powder grain". In principle, IGP coating powders with effect agents are agglomerate-free and fulfil the requirements for problem-free and reproducible processing.

There are five main processing categories for IGP effect powder coatings, ranging from 1-STAR* to 5-STAR*****. You can recognise the processing category of your product by the stars on the container label of your powder coating.

Order organisation

One batch - one application equipment

If the requirements in terms of shade and effect consistency are very high and the components are installed directly next to each other, we recommend determining the amount of powder required for coating the entire order, including a certain reserve, and coating the entire order with one production batch. This ensures colour and effect consistency when coating the entire order.

Pretreatment

Depending on the pretreatment method, the respective prescribed process parameters must be continuously monitored and strictly adhered to when processing IGPDURA®xal. The throughput time through the pretreatment line as specified by the system layout, particularly with regard to the rinsing process, must not be exceeded. This is the only way to ensure that the deep matte surface characteristics of the powder coating are not disturbed by impurities in the pretreatment or by inadequate rinsing processes.

Processing

Processing of IGP-DURA®xal can be carried out with all corona guns on the market with electrostatic charge in negative polarity at a high voltage setting of 50 to 80 kV. IGP-DURA®xal can be processed very well electrostatically, but depending on the shade and formulation, may be prone to spray-back effects at Film thicknesses of >90 µm.

These can be reduced by limiting the gun current to <10 µA. We recommend flat spray nozzles for efficient processing of IGP-DURA®xal.

When coating in long-stroke operation, the speed of the lifting devices must be adapted to the transport speed (coordinated sine wave of the guns). Coating in short-stroke operation requires the lifting height to be adapted to the intermediate distance between the guns (coordinated gun turning points). The manual application required in semi-automatic mode should always be carried out as a pre-coating. In the case of objects to be coated on both sides (e.g. profiles), the main visible side should be coated last. Processing IGP-DURA®xal with tribo guns is not recommended. Experience has shown that an insufficient tribo-electric charge is achieved for efficient processing.

For stable effect formation, the spraying distances between the gun and the workpiece must be observed. Please refer to the table at the end of the document. If the distances are not observed, there may be differences in the effect between the front and rear sides when coating both sides (profiles).

Reclaiming

In powder systems with cyclone recycling systems, the finest powder and effect particles are not separated in the cyclone, but are continuously removed from the powder coating. This removal results in a shift in the ratio of base colour to effect. As a rule, the shade becomes darker as a result.

Processing of **IGPDURA®xal** effect powder coating should only be carried out in pure loss mode without reclaiming in order to exclude colour changes due to effect losses. In the case of automatic coating, with a corresponding batch size, a certain amount of reclaimed powder can be added depending on the classification of the shade. Please refer to the table at the end of the document.

In this case, we recommend 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.

It is recommended to feed part of the powder through the reclaiming system before coating begins in order to use a stable mixture of fresh and reclaimed powder during the coating of the first product carrier.

Continuous dosing of fresh powder is recommended for processing IGP-DURA®xal without effect additives.

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®xal, particular care must be taken to ensure sufficient earthing. This measure contributes significantly to an even and consistent appearance of the surface.

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

Curing

Due to the deep matte surface and the unique surface characteristics of IGP-DURA®xal, even slight differences in gloss are visually very noticeable. With colours containing pearl mica, this difference in gloss can manifest itself as a visually different shade. Great attention must be paid to the curing process, as this has a significant influence on the gloss level.

In principle, an even temperature distribution in the oven is a basic prerequisite for achieving a uniformly deep matte surface over the entire surface of the hanging. The temperature prevailing in the oven and the heating rate are decisive for the level of gloss. Reducing the intended object temperature leads to an increase in gloss, exceeding it leads to a reduction in gloss.

For optimum cross-linking and to ensure the gloss of IGP-DURA®xal, we recommend creating a temperature profile of the curing oven with an oven measuring device under production conditions before starting production. The optimum time combination of object temperature and retention time should be determined depending on the thickness of the substrate to be coated.

If there are any irregularities with regard to temperature distribution in the curing oven, these must be corrected via the air flow or via further measures with the involvement of the oven manufacturer. Curing of the coated objects should always be carried out on the basis of the time combination of object temperature and retention time determined with the furnace measuring device, taking into account the recommended curing conditions.

If objects of one order are cured in different ovens, we recommend creating a temperature profile for each curing oven using an oven measuring device and coordinating the curing temperatures of the respective ovens.

Resistance and technical data

These can be found in the corresponding technical data sheets.

Cleaning

- The coated parts must be cleaned in accordance with the RALGZ 632 or SZFF 61.01 regulations
- For effect powder coatings, the technical information IGP TI106 must be observed

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Applicable documents

- Technical data sheets IGP-DURA®xal 4201 and IGP-DURA®xal 4601
- TI 000 Classification of effect powder coatings

Recommendations for Processing IGP-DURA®xal 4201 and 4601

The values given here are recommendations. When processing IGP-DURA®xal products, the processing parameters of the coating plants must be adapted to the product to be processed.

Equipment and processing parameters (equipment / accessories)	Setting (parameters) according to categorisation (including uni powder coatings)						Possible influences on (remark)
	uni	*****	****	***	**	*	
High voltage setting kV	50-80 kV	50-80 kV	60-80 kV	60-80 kV	60-80 kV	60-80 kV	Setting range for Processing IGP-DURA®xal
Current limiter µA (gun)	80 µA → <10µA à						àFor normal operation àReduces spray-back effects
Total air Nm³/h Conveying + dosing air (inner ⌀ powder hose)	12 mm = 5 m³/h 11 mm = 4 m³/h 10 mm = 3 m³/h						Prevents pulsation of the powder cloud, ensures optimum atomisation
Powder hose with integrated earthing (injector - gun)	recommended						Prevents electrostatic charging of the powder in the powder hose
Nozzle (gun) with flat spray nozzles	suitable						good depth, even atomisation
Nozzle (gun) with buffle plate	suitable						reduced depth of atomisation
Processing with ion-leakage ring (gun)	Suitable with or without	Without recommended					For uni, reduces spray-back effects

Coating spraying distance (gun - workpiece)	>200 mm	>200 mm	>250 mm	>250 mm	>300 mm	>300-350 mm	Prevents colour differences between front and back / Reduces streaks and cloud formation
Coating with tribo guns	Not suitable						Insufficient chargeability
Powder feed from fluidised container	Well suited, fluidising air as required						Uniform powder delivery and powder cloud
Powder delivery from the box	Conditionally suitable	Not recommended					Sometimes slightly irregular conveying. Risk of cloud formation, colour deviations
Screening with US screen (screening machine)	Suitable with mesh size > 140µm						Better fluidisation, more even application
Maximum proportion of reclaimed powder in recirculation mode without pre-testing the shade	≤ 90%	≤ 90%	≤ 10%	≤ 0%	≤ 0%	≤ 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	Not applicable	≤ 30%	≤ 25%	≤ 20%	≤ 10%	Prevents colour deviations during coating operation
Document processing parameters (control unit programme)	possible	possible	recommended	Recommended	Highly recommended	Highly recommended	Facilitates reproducibility of the coating results

Create limit samples in advance	Sufficient incoming inspection	Sufficient incoming inspection	Recommended	Highly recommended	Highly recommended	Highly recommended	Prevents excessive colour deviations from being subsequently objected to
Coating on different coating plants	possible	Possible	Possible after matching	Possible after matching	Conditionally possible	Not recommended	Different coating plants sometimes produce different effect characteristics
Manual pre-coating of the workpieces in semi-automatic operation	Possible	Possible	Recommended	Recommended	Highly recommended	Highly recommended	Lower tendency to colour deviations and streaks or clouding cloud formation
Manual follow-up coating of the workpieces in semi-automatic operation	possible	Possible	Possible after feasibility check	Not recommended	Not recommended	Not recommended	Increased tendency to colour deviations and streaks or clouding cloud formation
Manual coating only	Possible	Possible	Possible	Possible after feasibility check	Possible after feasibility check	Not recommended	Strong tendency to colour deviations and cloud formation with uneven coating