IGP POWDER COATINGS

Processing guideline

VR216 – IGP coating powder with metal interference pigments

Introduction

Effect powder coatings with metal interference pigments are summarised in a processing group at IGP under the name "Melted Metal". Compared to uni powder coatings, they place higher demands on Processing.

When processing effect powder coatings, the design of the coating plants and the application parameters have a significant influence on the coating result. Errors lead to differences in shade and effect and produce inconsistent coating results.

The processing guideline VR 216 was written to assist users in the error-free processing of IGP effect powder coatings from the Melted Metal processing group. High-quality IGP effect coatings containing metal interference pigments can be recognised by the letter "M" in the 5th position of the product key. They are assigned to the IGP effect category 2-STAR** with regard to their processing. You can recognise the processing category of your product by the stars on the container label of your powder coating

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Order organisation

One batch - one application equipment
If the components are installed directly next to each other, we recommend determining the amount of powder required for coating the entire job, allowing for a certain reserve and coating the entire job with one finished batch. This minimises colour and effect differences when coating the entire application.
Experience has shown that Application with devices from different manufacturers (due to different characteristic curves of the high-voltage generators) produces 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 (tribo coating: positive polarity, corona coating: negative polarity) significantly influence 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.

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 strictly adhered to. This procedure and parameter settings must also be adhered to when coating subsequent orders.

We strongly recommend the production of limit samples to check that they match the ordered shade (incoming inspection!) and to monitor the shade and effect throughout production. A check for any deviation from the tolerance limits must be carried out under suitable lighting conditions of coated parts (outgoing inspection).

Processing

Automatic coating is always preferable to manual coating. Any manual application required in semi-automatic mode should always be carried out as a pre-coating.

Color tones and effect fluctuations as well as cloud formation are to be expected with a purely manual coating 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.

Processing of coating powders with metal interference pigments should always be carried out using corona guns with electrostatic

charge in negative polarity without ion-leakage rings.

The spraying distance between the object and the gun should be greater than 350 mm.

Processing on vertical systems is possible to a limited extent if the spraying distance can be adjusted and values greater than 300-350 mm are possible. If this is not possible, coating on vertical systems is not recommended.
In any case, practical tests are necessary before starting production.

Special notes on rinsing air and gun distances
For safe Processing and to avoid powder deposits in the spray nozzle, it is recommended to increase the total air or dosing air by approx. 0.5-1.0 m^3/h. The total air should always be increased first.

The total air should always be increased first before the rinsing air is adjusted. This step may have to be repeated until no more deposits are recognisable. In addition, the rinsing air or gun air (different names for each system manufacturer) should be increased by approx. 0.1-0.2m^3/h. At the start of the coating process, the coating should be interrupted after 1-2 minutes of spraying and the spray nozzles checked for powder deposits.

If deposits are found in the spray nozzle, the total or dosing air should be increased further until no more deposits are visible. If the deposits can only be recognised at certain points on the electrode, the flushing or gun air should be increased further in small steps. A value of approx. 0.4 m^3/h should not be exceeded.

If, despite this value, 0.4 m^3/h deposits remain on the electrode tip, higher values may be necessary in individual cases. In these cases, it is essential to prevent the purge air from negatively affecting the spray cloud. In such cases, a functional test of the purge air is recommended.

If the deposits remain on the electrode, this can lead to a strongly deviating surface and effect characterisation.

For a more consistent effect, powder should be sprayed with the coating parameters found for approx. 30–60 seconds before feeding in the parts before each productive coating.

Special notes on high voltage and Film thickness
During coating, care must be taken to ensure a uniform film thickness, especially on geometric components. Approx. 95 µm is recommended to achieve an attractive flow.

In order to achieve an effect that is as consistent as possible, it is recommended to use higher voltages of 90-100 kV for items in the silvery colour range.

Depending on the shade, it may also be necessary to increase the pre- and post-spraying of the guns.

If possible, all components should be coated at once and not split up into different stages.

Reclaiming

In powder systems with cyclone recycling systems, the finest powder grains and effect particles are separated in the cyclone and are continuously removed from the powder. This removal results in a shift in the ratio of effect particles to the base colour.
In order to minimise colour changes due to effect losses during coating, metal interference products can only be processed in pure loss mode 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, 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 process before coating begins in order to use a stable mixture of fresh and reclaimed powder during the coating of the first object.

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 provided for this purpose. Various functional checks, such as checking the high voltage, must be carried out at regular intervals.

If the components are subject to increased wear, there is an increased tendency for powder to accumulate on and in the spray nozzle, which can lead to spitting on the components.

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 always coated together.

Curing

Different curing temperatures and heating speeds of the parts must be avoided, just as thick and thin-walled parts must not be coated at the same time. The recommended curing window must be adhered to.

Earthing

When processing coating powders with metal interference pigments, particular care must be taken to ensure sufficient earthing. This measure contributes significantly to a uniform consistency of the shade and effect formation.

Applicable documents

Technical data sheets

- TI 000 Classification of effect powder coatings
- TI 106 Cleaning recommendations for IGP coating powders with pearl mica effect
- TI 119 Colour tolerances for uni and effect powder coatings

Recommendations for Processing IGP coating powder with metal interference pigments

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

Equipment or processing parameters (equipment/accessories)	**Setting (parameters) according to categorisation** ****	**Possible effect (comment)**
High voltage setting (gun) kV	60 - 80 90-100 for colours in the silvery colour range	Setting range for Processing
Current limiter µA (gun)	Approx. 10 µA with sufficient charge 10 - 30 µA if charge is too low	Reduces possible edge greasing, prevents the formation of orange peel
Total air m³/h / conveying + dosing air (inner diameter of powder hose)	See section above for special notes on purge air and gun distances.	Prevents deposits in the spray nozzle and spitting. Check the required values for initial coating!
POE powder hose with integrated earthing (injector gun)	Earthing the injector	Prevents electrostatic charging of the powder in the powder hose.
Nozzle (gun) with flat spray nozzles	See section above for special notes on purge air and gun distances.	Prevents deposits on the electrode and spitting
Nozzle (gun) with buffle plate	Suitable after testing	Must be tested by coater for each system and article
Processing with / without ion-leakage ring (gun)	Processing without ion-leakage ring recommended	Spitting possible when Processing with ion-leakage ring
Spraying distance coating (gun-workpiece)	> 350 mm	Uniform layer thickness distribution / prevents streaking
Coating with tribo guns (guns)	Not suitable	Significant colour deviations possible
Powder feed from fluidised container	well suited, fluidising air as required	Uniform powder feed and powder cloud
Powder delivery from the box	Not suitable	sometimes slightly irregular conveying and therefore irregular layer thickness/effect formation.
Screening with US screen (screening machine)	suitable with mesh size > 140µm	Better fluidisation, more even Application
Maximum proportion of reclaimed powder in circulation mode without testing the shade	0%	Prevents colour deviations during coating operation
Maximum proportion of premium bond reclaimed powder in recirculation mode with advance testing of the shade	≤ 20 %	Prevents colour deviations during coating operation

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Recommendations for Processing IGP pearl mica effects

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

Systems and processing parameters (equipment / accessories)	**Setting (parameters) according to categorisation** ****	**Possible effect (comment)**
Document processing parameters (control unit programme)	Highly recommended	Prevents incorrect settings when coating is repeated
Limit sample in advance	Test coating strongly recommended	Parameters for error-free coating must be determined in advance
Coating on different coating plants	Test coating strongly recommended	Different coating plants sometimes produce different effect characteristics
Manual pre-coating of the workpieces in semi-automatic operation	strongly recommended	Lower tendency to colour deviations and streak or cloud formation
Manual follow-up coating of the workpieces in semi-automatic operation	not recommended	Increased tendency to colour deviations and streak or cloud formation
Manual coating only	Possible after feasibility check	Strong tendency to colour deviations and cloud formation with uneven coating