IGP POWDER COATINGS

Processing guideline

VR203 – IGP metallic effects

Introduction

This processing guideline VR 203 has been written to assist users in processing IGP powder coatings with a metallic effect (D -> 5th digit of the IGP article designation). The metallic impression of these metallic paints is created by aluminium particles covering the entire surface. To protect these pigments from oxidation in the long term, metallic lacquers of this type must be overcoated with a transparent protective lacquer.

IGP metallic effect powder coatings that are to be overcoated with a clear coat can be recognised by the "H" marking in the 11th position of the IGP article designation. There are five main processing categories for IGP effect powder coatings, from * to *****. The products with "metallic effect" are labelled 1* throughout, as they place significantly higher demands on the coating than uni powder coatings without metallic effect particles.

Order organisation

One batch - one application equipment - same parameters

If parts with metallic effect powder coatings are installed directly next to each other, the amount of powder required for coating the entire order must be determined, a certain reserve must be planned for and the entire order must be coated with one manufactured batch number. This minimises colour and effect differences when coating the entire order. Experience has shown that results differ in terms of shade and effect due to the different characteristics of coating devices from different manufacturers.

Electrostatic parameters such as the level of the set high voltage, the setting of the current limiter (µA) and the use of ion-leakage rings significantly influence the charging behaviour as well as the shade and effect formation. It is strongly recommended to create limit samples before the start of production and to use these throughout production and output control to check the shade and effect.

Processing

For Processing IGP metallic effects, we recommend using corona guns with electrostatic charge in negative polarity.

Corona guns and their nozzles must be suitable for processing metal effect powder coatings. The spray current must not be limited to < 80 µAmpere and ion-leakage rings must not be used.

Due to the proportion of metallic effect pigments, limiting the spray current can lead to short-circuit effects and thus to a loss of charge in the metallic effect powder coating being processed. Increasing the nozzle rinsing air to a maximum of 0.5 m^3/h counteracts a loss of charge due to the short-circuit effect.

Any manual application required in semi-automatic mode should always be carried out as a pre-coating. For objects to be coated on both sides (e.g. profiles), the main visible side should be coated last. When overcoating the metal effect powder coating with clear coat, it is recommended to set the high voltage between 50 and 60 kV.

Reclaiming

Due to the proportion of overspray that is reclaimed via the separation system, the processing of metallic effects can lead to an accumulation of effect pigments when reclaiming using filters, or to a reduction of effect pigments when reclaiming using cyclones.

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

In order to exclude colour tone changes due to effect losses during coating, the processing of IGP metallic effects can only be carried out in pure loss mode without reclaiming. Even with automatic coating of IGP metallic effects, no reclaiming mode can be used. In the case of automatic coating of IGP metallic effects produced using the IGP premium bonding process (ending A30 or H30) with a corresponding batch size, a small amount of reclaimed powder can be added automatically, provided that optimum mixing with fresh powder is guaranteed. Please refer to the table at the end of this document.

However, it then remains the coater's own responsibility to produce a tolerable and reproducible shade. In any case, it is advisable to create limit samples before the start of production and to use these throughout production and for output control to check the shade and effect.

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 components are always coated together. Mixing thick and thin-walled parts in the coating process must be avoided at all costs.

Earthing

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

Curing

Depending on the melt viscosity, a change in the effect (visually recognisable as a difference in colour tone) can be provoked by the temperature control in the curing oven and the mass of the coated workpiece. As a result, different curing temperatures and heating speeds must be avoided, just as thick and thin-walled parts must not be coated together.

Resistance and technical data

These can be found in the corresponding information sheets.

Applicable documents

- TI000 Categorisation of effect powder coatings

Recommendations for Processing IGP metallic effect powder coatings

The values given here are "recommendations". When processing IGP-Mettalic effect powder coatings, we recommend adapting the processing parameters of the coating plants to the "product" to be processed.

Equipment and processing parameters (equipment / accessories)	Setting (parameters) according to categorisation	Possible influences on (remark)
	*	
High voltage setting kV	80-90kV	Sufficient charging (note actual values)
Current limiter µA (gun)	>80 µA	Sufficient charging
Total air Nm3/h Conveying + dosing air (internalø powder hose)	12mm = 5 Nm3/h 11mm = 4 Nm3/h 10mm = 3 Nm3/h	Prevents pulsation of the powder cloud
Powder hose with integrated earthing (injector - gun)	Earthing the injector	Prevents electrostatic charge in the powder hose
Nozzle (gun) with flat spray nozzles	Suitable	Ensure a "soft" cloud
Nozzle (gun) with buffle plate	suitable	Reduced depth
Processing with ion-leakage ring (gun)	Without recommended	For use: Increased spitting tendency / reduced charging
Spraying distance Coating (gun - workpiece)	≥ 250mm	Prevents blow-off effects
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	Slightly irregular conveying in some cases
Screening with US screen (sieving machine)	Recommended with mesh size >140µm	Better fluidisation, more even application
Maximum proportion of reclaimed powder in recirculation mode Without testing the shade	0%	Prevents colour deviations during coating operation
Maximum proportion of Mica Bond reclaimed powder in circulation mode with pre-testing of the shade	0%	Prevents colour deviations during coating operation
Maximum proportion of Premium-Bond reclaimed powder in circulation mode with pre-testing of the shade	≤ 10%	Prevents colour deviations during coating operation (limit sample recommended)
Processing parameters (control unit programme) Document	Highly recommended	Facilitates reproducibility of the coating results
Create limit samples in advance	Highly recommended	Recommended for first use
Coating on different coating plants	Possible after adjustment	Different coating plants produce different effects in some cases
Manual pre-coating of the workpieces in semi-automatic operation	Highly recommended	Lower tendency to colour deviations
Manual follow-up coating of the workpieces in semi-automatic operation	Not suitable	High tendency to possible colour deviations
Manual coating only	Suitable after feasibility check	Ensure even spraying distance