

## Processing guideline

# VR202 – IGP coarse structure and hammer tones

## Introduction

This type of coating powder produces surfaces with a relatively coarse, non-rough and clearly defined structure. The formation of the structure size and embossing is very dependent on the film thickness applied (low film thickness results in finer structures, high film thickness results in coarser structures).

Due to these surface characteristics, special demands are placed on the coater. The VR 202 processing guideline was drawn up to assist users in the error-free processing of IGP coarse structures and hammer tones.

As IGP hammer blow powders are powders containing effect agents, they are also categorised into the five processing categories. You can recognise the processing class of your product by the stars on the container label of your powder coating.

IGP coarse structure and hammer finish powder coatings are labelled with a "2" in the third position of the IGP product key (e.g. 792S).

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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.

Avoid processing an order 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.

To ensure the required structure formation, the creation of limit samples is recommended before processing the order. These limit samples should be used throughout production to monitor the structural characteristics, gloss and shade. For more complicated geometries, it may also be necessary to coat a preliminary series (mock-up) to ensure consistent surface characteristics.

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## Pretreatment of the substrate

Particularly careful cleaning of the metallic substrate is required for coatings with textured powders: residues of oil, grease, graphite or welding aids result in disturbances that can be clearly visible as large dark contaminations on the film surface due to a different surface tension or can prevent the formation of a texture.

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## Processing groups

As the characteristics of the structure are largely determined by the layer thickness, care must be taken to ensure that the layer thickness is distributed as evenly as possible during coating. Average layer thicknesses of at least 90-110µm are recommended for an attractive surface characteristic and sufficient hiding power.

With light, red, yellow and orange shades, complete coverage of the substrate cannot be guaranteed with the above-mentioned Film thicknesses. A pre-coating in the corresponding shade is recommended to cover the substrate (2-layer structure).

Fluctuations in the structure are mainly caused by greasy edges (too thick a layer) or too thin a layer on the inside edges. To avoid edge greasing, it is recommended to adjust the high-voltage settings, as well as the stroke movement and the forward and backward movement of the guns as precisely as possible to the workpiece. As the stroke movement, lead and lag are strongly influenced by the component geometry and the arrangement of the coating guns, no general recommendations can be made.

Medium settings of 60-80kV are recommended for the high voltage, and a current limiter of approx. 10µA can also be used to reduce edge greasing. In some cases, ion-leakage rings can also be used after checking.

If a uniform coating thickness is not possible due to the part geometry (deep internal angles), an additional manual coating is required. This can be done both as a pre- and follow-up coating. Pure manual coating is possible, but care must be taken to ensure an even coating.

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## Reclaiming

In principle, uni coarse-textured powder coatings are suitable for reclaiming. Powder coatings with a hammer tone can also be processed with a certain proportion of reclaimed powder after preliminary testing of the shade. Please refer to the table below. Special attention must be paid to thorough cleaning of the entire coating plants: guns, hoses, powder booth etc., before filling with a coarse texture powder, as well as when changing back to other powder qualities.

When changing from a smooth coating powder to a coarse texture powder to avoid contamination of the texture: Contamination of a coarse-textured powder with different coloured smooth-textured coating powders is particularly noticeable because the contaminating particles of the smooth-textured powders spread on the textured substrate during the melting phase, i.e. they increase by a factor of 5-10 of the original particle size.

When changing from coarse-textured powder to smooth coating powder, in order to prevent surface defects such as craters, pinholes or poor flow, it is always recommended to rinse the powder hoses sufficiently with the new powder after the colour change (spraying powder without workpiece in the booth). In addition, flow or wetting problems can be reduced if a powder with a fine structure is processed before and after the coarse-structured product.

If contamination of the powders is not avoided despite thorough cleaning and rinsing of the powder hoses, it may be necessary to install separate powder hoses on the booth for the coarse-textured powders and to replace these when changing colours. Depending on the system manufacturer, this can be done in a few simple steps.

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## Maintenance and Cleaning of the system

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. Various functional tests, such as checking the high voltage, must be carried out at regular intervals.

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## 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 using a parts detection system. It is also important to ensure that similar workpieces are always coated together.

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## Curing

Depending on the mass of the workpieces to be coated and the temperature control in the curing oven, different and uneven structures result from the melt viscosity and reaction time. As a result, different curing temperatures and heating speeds should be avoided, and thick and thin-walled parts should not be coated at the same time

Matt textured coatings only achieve the required surface and gloss values if they are cured according to the specifications. Curing too short or too low results in surfaces with too high a gloss and insufficient mechanical properties. Curing too long or too high can lead to colour changes (effect powder coatings), yellowing and matt surfaces.

To avoid problems caused by irregular heating of the components, different curing temperatures and the simultaneous curing of thick and thin-walled parts should be avoided.

The recommended curing window must be adhered to. To ensure quality, a furnace measurement is recommended as early as the preparation of the limit sample.

The Curing conditions from the technical data sheets must be observed.

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## Earthing

As with the coating of all powder coatings, sufficient earthing must be ensured when coating coarse structures and hammer tones. This contributes to an even deposition of the powder on the workpiece and thus to homogeneous structural characteristics.

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## Applicable documents

The respective [technical data sheets](#) of the product groups must be observed.

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## Resistance and technical data

These can be found in the relevant information sheets.

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## Recommendations for Processing IGP coarse structure and hammer blow products

The values given here are "recommendations". When processing IGP coarse structures and hammer blow powders, 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 Groups A / **		Possible effect
	Uni / speckles products Group A	Pearl mica **	
High voltage setting (gun)	50 - 80 kV	60-80 kV	Setting range for Processing

Setting range for Processing	80 $\mu$ A → < 10 $\mu$ A →		→ For normal operation → Reduces edge lubrication
Total air m <sup>3</sup> /h / conveying + dosing air (inner diameter of powder hose)	12 mm = 5 m <sup>3</sup> /h 11 mm = 4 m <sup>3</sup> /h 10 mm = 3 m <sup>3</sup> /h		Prevents pulsation of the powder cloud, ensures optimum atomisation.
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	suitable		good depth, even atomisation.
Nozzle (gun) with baffle plate	suitable		Reduced depth of atomisation
Processing with / without ion-leakage ring (gun)	Suitable with or without	Processing only with or only without	reduces spray-back effects
Coating spraying distance (gun-workpiece)	≥ 250 - 300 mm	≥ 300 mm	Uniform coating - reduces irregular coating thicknesses
Coating with tribo guns (guns)	Not suitable		Insufficient charging of the powder
Powder feed from fluidised container	Well suited, fluidising air as required		Uniform powder feed and powder cloud
Powder feed from the delivery container	Suitable to a limited extent		Slightly irregular conveying in some cases. Risk of uneven layer thickness
Screening with US screen (screening machine)	suitable with mesh size >140 $\mu$ m		Better fluidisation, more even application
Maximum proportion of reclaimed powder in recirculation mode without testing the shade	Uni: ≤ 90%	0%	Prevents colour deviations during coating operation
	Speckles: ≤ 15%		
Maximum proportion of Mica Bond reclaimed powder in circulation mode with preliminary testing of the shade	not applicable	≤ 10%	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	Prevents colour deviations during coating operation
Document processing parameters (control unit programme)	possible	recommended	Facilitates reproducibility of the coating results
Create limit samples in advance	possible	Highly recommended	Prevents excessive shade and texture deviations from being subsequently objected to
Coating on different coating plants	possible	Possible after adjustment	Different coating plants sometimes produce different effect and structural characteristics
Manual pre-coating of the workpieces in semi-automatic operation	possible	possible	Necessary for internal angles

Manual follow-up coating of the workpieces in semi-automatic operation	possible	possible	Necessary for internal angles
Manual coating only	Possible after feasibility check	Possible after feasibility check	Strong tendency to structure and effect deviations with uneven coating

\*\* Processing category of effect products according to TI000

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