

Processing guideline

VR209 – Processing of IGP transparent powder coatings

Introduction

IGP transparent powder coatings are mainly used as a topcoat for overcoating metallic coatings. The aim here is to achieve an additional protective effect (protect metallic effects) or a special depth effect. For the application of IGP transparent powder coating as a topcoat on substrates that have already been coated, certain application and system requirements must be observed for Processing. VR 209 informs the processor about the process parameters that have a significant influence on the coating result. For various applications, IGP transparent powder coatings

- for interior use
- as façade quality
- as weather resistant outdoor quality
- or as a super durable quality

with a two-coat application for exterior use. IGP transparent powder coatings are labelled with a "B" in the fifth position of the IGP product key (e.g. 5903B).

Processing

Processing of IGP transparent powder coatings can be carried out with all corona guns on the market with electrostatic charge with negative polarity. If an initial coating is applied to metal surfaces, a high-voltage setting of 60 to 70 KV should be used. When overcoating substrates that have already been coated, we recommend processing with a reduced high-voltage setting of 50 to 60 kV.

Spray-back effects can be avoided by using ion-leakage rings (low-ion charge), or by limiting the spray current [μA] to $< 10 \mu\text{A}$ if the spraying distance is $< 250 \text{ mm}$.

We recommend flat spray nozzles for efficient processing of IGP transparent powder coatings. The spraying distances can be set to $\geq 250 \text{ mm}$. To optimise the coating thickness distribution and to homogenise the effect of lightly pigmented transparent powder coatings, the speed of the lifting devices must be adapted to the transport speed when coating in long-stroke operation (coordinated sinusoidal curve of the guns). Coating in short-stroke operation requires the lifting height to be adapted to the distance between the guns (coordinated gun turning points). Any necessary manual application in semi-automatic mode should be carried out as a pre-coating.

Processing IGP transparent powder coatings with tribo guns is generally not recommended. As a rule, an insufficient triboelectric charge is achieved for efficient processing.

In order to achieve a flawless and undisturbed surface, we recommend processing IGP transparent powder coatings with Film thicknesses of $80 \mu\text{m}$ to $100 \mu\text{m}$. For manual coating in particular, it is necessary to coordinate the application parameters and coating technology in order to avoid surface damage, such as that caused by high-voltage impacts, at film thicknesses of $> 90 \mu\text{m}$.

When using IGP transparent powder coating as a topcoat, we recommend coating the powdered and baked substrate promptly and without intermediate handling.

Reclaiming

Continuous dosing of fresh powder is recommended for Processing IGP transparent powder coatings in reclaiming mode.

Mounting the parts

Mainly when processing lightly pigmented transparent powder coatings, the mounting of the workpieces must be determined before coating (horizontally or vertically). The distances between the coating objects within the hangers 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.

Earthing

When processing IGP transparent powder coating, ensure that the hangers are sufficiently earthing. This measure contributes significantly to a constant and homogeneous layer thickness distribution.

Curing in the oven

When processing IGP transparent powder coatings, special attention must be paid to the curing process.

Based on these conditions, 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 in the temperature distribution in the curing oven, these must be corrected via the air flow.

Curing in indirectly heated ovens

The curing process requires precise temperature control while maintaining a temperature-time combination at object temperature in order to cross-link the powder layer to a sufficient extent. A uniform temperature distribution in the oven is a basic prerequisite for optimum cross-linking of the powder coating over the entire surface. The temperature prevailing in the oven is decisive for the degree of cross-linking of the product. If the temperature falls below the required object temperature (under-crosslinking), the adhesion of the IGP transparent powder coating to the substrate is not guaranteed; exceeding this temperature (over-curing) usually results in yellowing of the powder coating layer.

Curing in directly heated gas ovens

The same basic requirements apply for curing IGP transparent powder coating with directly heated gas ovens as for indirectly heated ovens. The susceptibility to yellowing of the transparent varnish is significantly higher! Special attention must also be paid to the intermediate adhesion to the basecoat. Nitrogen oxides [NO_x] are released during the curing process due to the direct flame treatment of the oven interior. This chemical process only occurs in directly heated gas ovens. As a result of the release, the adhesion properties of the base powder coating for overcoating with a transparent powder coating deteriorate significantly during the curing process within the specified curing window.

In this case, it is advisable to underbake the base powder coating and limit the retention time of the objects in the oven only to reaching the required object temperature. A time of approx. 3 minutes per 1 mm wall thickness is usually required to heat the substrate to object temperature. After top coating with transparent powder coating, the objects can be cured in compliance with the temperature/time combination specified by the manufacturer (retention time at object temperature).
