

## Applying IGP-Transparent Powder Coatings

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A DOLD GROUP Company

### Product Description

IGP transparent powder coatings are mainly used as topcoats for protecting metallic coatings. The objective is to provide a protective coating (protect the metallic effects) or to achieve a special depth effect. To apply IGP transparent powder coating as a topcoat on a previously coated substrate, specific application and system-relevant prerequisites must be observed. VR 209 contains user information on the process parameters which have a significant impact on the coating result.

For the various applications, IGP transparent powder coatings for

- indoor applications
- facade quality
- weather-resistant outdoor quality
- or extremely weather-resistant quality with a two-coat requirement for outdoor applications can be used.

IGP transparent powder coatings are indicated by the letter «B» as the fifth character of the IGP product key (e.g., 3503B, 5903B,...).

You will find an overview of all smooth finish IGP transparent powder coatings at the end of this VR.

### The application process

IGP transparent powder coatings can be applied with any readily available corona gun with electro-static charge in negative polarity.

When a primer is applied to metal surfaces, the high voltage setting should be between 60 to 70 kV.

When topcoating a previously coated substrate, we recommend applying with a reduced high voltage setting between 50 to 60 kV.

Backspray effects can be avoided by using an ion leakage ring (low ionic charging) or by ensuring appropriate spray distances < 250mm by limiting the spray stream [ $\mu\text{A}$ ] to < 10  $\mu\text{A}$ .

For efficient application of IGP transparent powder coatings, we recommend using a fan nozzle. Spray distances can be set to  $\geq 250$  mm.

To optimize the coating thickness distribution and ensure an even effect appearance when using lightly pigmented transparent powder coatings, the speed of the lifting devices should be adjusted to the transport speed (coordinated sine wave pattern of guns) for coating in long stroke operation. For coating in short stroke operation, the stroke height must be adjusted to the distance between the guns (coordinated gun turning points). A primer applied using manual application in semi-automatic operation is required.

In general, applying IGP transparent powder coatings with tribo guns is not recommended. The normal tribo-electrical charge achieved is generally insufficient for efficient application.

To obtain a satisfactory and flawless surface, we recommend coating thicknesses between 80  $\mu\text{m}$  to 100  $\mu\text{m}$  when applying IGP transparent powder coatings. Particularly with manual application, it is necessary to coordinate the application parameters and coating technique when applying coating thicknesses > 90  $\mu\text{m}$  in order to avoid adverse effects such as those caused by the impact of high voltage.

When using IGP transparent powder coating as a topcoat, we recommend coating the powder-coated and cured substrate without delay and without intermediate treatment.

### Recycling

When applying IGP transparent powder coatings in recycling mode, we recommend the continuous addition of fresh powder.

### Hanging the components

Particularly when applying lightly pigmented transparent powder coatings, how the workpieces are to be hung must be determined prior to coating (horizontally or vertically). The spacing between the coating objects within the hanging rack, as well as the spaces between the hanging racks should be minimal and uniform. For larger distances between the hanging racks, it is recommended that the guns are automatically switched on and/or off by means of a component sensor.

### Earthing

If using IGP- transparent powder coating as a topcoat for previously coated substrates, adequate earthing of the hanging racks must be ensured.

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### Curing

When applying IGP transparent powder coatings, particular care should be taken with the curing process.

#### Curing in ovens with indirect heating

The curing process requires precise temperature control while complying with a prescribed temperature/time combination for object temperature in order to cross-link the powder coating adequately.

Even temperature distribution in the oven is the basic prerequisite for an optimal powder coating cross-linking process for all objects within the entire hanging rack. The temperature within the oven is vital to the product's level of cross-linking. If the object temperature remains below the required level (insufficient cross-linking), the adhesion of the IGP transparent powder coating to the substrate is not guaranteed. Exceeding the required object temperature (excessive cross-linking) generally causes the powder coating to yellow.

Based on these circumstances, before beginning production, we recommend creating a temperature profile of the curing oven under production conditions, using an oven temperature assessment device. This is to determine the optimal time combination of object temperature and retention time, depending on the thickness of the substrate to be coated.

If there are inconsistencies within the curing oven in terms of temperature distribution, they must be corrected via the air control system.

#### Curing in gas oven with direct heat

For curing IGP transparent powder coating in a gas oven with direct heat, the same basic prerequisites apply as for ovens with indirect heating. The susceptibility to some yellowing in transparent coating is significantly greater! Furthermore, particular care must be given to the intermediate adhesion to the base coat.

Due to the direct firing of the oven interior, nitrogen oxide [NO<sub>x</sub>] is released during the curing process. This chemical reaction only occurs in gas ovens with direct heating. The release of nitrogen oxide during the curing process within the prescribed range of curing conditions causes a significant deterioration of the base powder coatings' adhesion properties for a transparent powder coating topcoat.

In this instance, it is recommended to insufficiently cross-link the base powder coating and to limit the object's retention time solely to the point at which the prescribed object temperature is achieved.

Generally, a time period of approximately 3 minutes per 1 mm wall-thickness is required for heating the substrate to the prescribed object temperature.

After the transparent powder topcoat, the objects can be cured as prescribed in the manufacturer's recommendations for temperature/time combinations (retention time at object temperature).

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### Overview of all smooth finish IGP transparent powder coating with curing conditions: (retention time at object temperature)

| Product line                     | Surface     | Gloss level      | Properties   | Object temp. [°C].  |
|----------------------------------|-------------|------------------|--|---|
| IGP-HWF <sup>classic</sup> 5903B | transparent | 25 - 35 R' / 60° | HWF-powder/outdoor applications extempely wather-resistant quality | min. 190 °C 15 to 200 °C 10 to max. 25 Min. 20 Min.                     |
| IGP-HWF <sup>face</sup> 8005B    | transparent | 45 - 55 R' / 60° | Polyurethane coating system, weather resistant                     | min. 180 °C 20 to 190 °C 10 to 200 °C 7 to max. 25 Min. 20 Min. 15 Min. |
| IGP-HWF <sup>face</sup> 8009B    | high gloss  | > 85 R' / 60°    | Polyurethane coating system, weather resistant                     | min. 180 °C 15 to 190 °C 10 to 200 °C 5 to max. 25 Min. 15 Min. 10 Min. |
| IGP-HWF <sup>than</sup> 8109B    | high gloss  | > 85 R' / 60°    | Polyurethane coating system, weather resistant / half transparent  | min. 180 °C 15 to 190 °C 10 to 200 °C 5 to max. 25 Min. 15 Min. 10 Min. |
| IGP-HWF <sup>than</sup> 8909B    | high gloss  | > 85 R' / 60°    | Polyurethane coating system , weather resistant / antigraffiti     | min. 180 °C 15 to 190 °C 10 to 200 °C 5 to max. 25 Min. 15 Min. 10 Min. |
| IGP-HWF <sup>xal</sup> 4601B     | deep matt   | > 10 R' / 60°    | Acrylat-Polymer-coating system, weather resistant                  | min. 180 °C 15 to 190 °C 10 to 200 °C 5 to max. 25 Min. 15 Min. 10 Min. |

Self-testing and experiments must be carried out in all cases. The information at hand is to be considered as guidelines. Coating-related and system-specific differences are possible.