IGP POWDER COATINGS

Processing guideline

VR215 – Processing "powder on powder"

Introduction

In contrast to a classic two-coat system with the Application of the primer, the subsequent gelling or curing and the subsequent top coat, the process of coating without curing the primer before the top coat places special demands on the coater. In addition, only certain powder coatings from the standard range are suitable for this process. In principle, various charging methods are available for application using the powder on powder process.

We recommend the use of IGP-KORROPRIMER 1808A in combination with the top coats IGP-DURA®one 5603A, 5607A and 6609A, as well as IGP-HWFindustry 7906A and 7909A. Article group 591TA is also conditionally suitable. However, application tests are recommended before coating.

General processing information

Processing using the "powder on powder" method can be carried out using corona charging for the application of the primer and tribo charging for the application of the topcoat or using positively charged corona charging for the application of the primer and negatively charged corona charging for the application of the topcoat. All commercially available devices with corona and tribo charging are suitable. The use of classic tribo guns or the use of so-called tribo lances is irrelevant. Tribo lances only offer the advantage of being able to conveniently coat more distant areas on large workpieces. Processing of primer and top coat can also take place for both powders with tribo charging, but this reduces the efficiency of the coating and increases the risk of mixing the two powders during the application process.

Coating only with negatively charged corona charging should be avoided, as this produces a less attractive surface and very quickly leads to spray-back effects and mixing of the powders. As with all electrostatic powder coatings, care must be taken to ensure adequate earthing when processing using the powder on powder method. The correct earthing of the components should be monitored regularly throughout the coating process. Insufficient earthing can lead to a severe deterioration in the coating result and efficiency. After the actual coating process, care must be taken to ensure that the workpiece is conveyed as vibration-free as possible until curing. If there is any vibration, powder can come loose in places and partially contaminate underlying surfaces.

Substrate

Processing "powder on powder" is generally possible on substrates such as Steel and Aluminium. Restrictions must be made when using galvanised steel. Due to the outgassing tendency of galvanised surfaces during the curing process, a special outgassing friendly primer is usually used on these substrates. This degassing effect is greatly reduced when processing "powder on powder" due to the joint curing with the top coat.

Application Corona (negative) with tribo

No special aspects need to be taken into account during the coating of the primer powder with negative corona charging. Application can be carried out in the same way as for coating in the classic two-coat system. However, limiting the current and setting the high voltage to <80 kV can facilitate the subsequent top coat and reduce the likelihood of spray-back effects or mixing of the powders. Film thicknesses of the primer >100 µm should also be avoided, as these can have a negative effect on the subsequent top coat.

During the coating of the top coat using tribo charging, particular care must be taken to ensure that the powder is sufficiently charged. Depending on the gun used, a leakage current >1.5 µA is recommended. In addition, care must be taken to achieve the softest possible "cloud" during the coating process. This is achieved by adjusting the ratio between the conveying and dosing air (depending on the

system type, also the total air and powder quantity) and the set tribological air. If the air volume is too low, this results in irregular powder output, including spitting and insufficient charging of the powder. If the air flow rate is too high, the powder exits the nozzle at too high a speed, which can lead to the powder and primer being blown off. This immediately results in mixing of the top coat and primer. Spraying distances that are too short should also be avoided in order to prevent blow-off.

Application Corona (positive) with Corona (negative)

When coating the primer powder with positive corona charging, care should be taken to regulate the high voltage setting. Compared to negative corona charging, positive charging requires slightly higher high-voltage settings (kV). However, the current limiter (µA) should be used here. Depending on the system manufacturer, settings <15µA are recommended. Film thicknesses of the primer >100 µm should also be avoided, as these can have a negative effect on the subsequent top coat.

During the coating of the top coat with negative corona charging, care should be taken to achieve the softest possible "cloud" during the coating process. This is achieved by adjusting the ratio between the conveying and dosing air (depending on the system type, also the total air and powder quantity). If the air volume is too low, this will result in irregular powder output and even spitting. If the air volume is too high, the powder is ejected from the nozzle at too high a speed, which can lead to the powder and primer being blown off. This immediately results in mixing of the top coat and primer. Spraying distances that are too short should also be avoided to prevent blow-off as described above. The high-voltage setting must also be observed. In particular, "overcharging" due to an excessively high spray current (µA) must be prevented, as this can quickly lead to mixing of the two powders. It is therefore recommended to use the current limiter <10µA, as well as the use of so-called ion-leakage rings to reduce charges that are not used to charge the powder. In addition, layer thicknesses >100µm should also be avoided for the top coat, as this can negatively affect the quality of the cured surface.

Reclaiming

If the coating of primer and topcoat is carried out in the same booth and it is not possible to prevent primer powder from entering the powder circuit of the topcoat or, conversely, topcoat from entering the powder circuit of the primer powder during the coating process, reclaiming mode should not be used. Reclaiming mode is possible when processing primer and topcoat in two separate coating booths. However, care should be taken to minimise the amount of overspray generated, as the processability of the powder may deteriorate slightly over time due to the high stress in the recovery process. The reclaimed powder should be added to the fresh powder as automatically and in uniform quantities as possible. This ensures a constant ratio of fresh and reclaimed powder in the powder container. For top coats with effect, the relevant instructions in the technical data sheets must be observed.

Cross-linking

For the curing process, use the information from the corresponding data sheets for the powder coatings used. It must be ensured that a setting is selected that does not lead to over-curing of the primer or under-curing of the topcoat. The joint melting and cross-linking of the primer powder and the topcoat can lead to interactions that influence the characteristics of the surface and the gloss of the baked surface. The surface may therefore exhibit gloss values outside the ranges specified in the technical data sheets. These results are reproducible and should be determined and approved using limit samples before the start of production. These limit samples can be used to monitor quality during the Application.

Measurement of the individual layer thicknesses

In contrast to a classic two-coat system with gelling / curing of the primer, it is not possible to measure the layer thickness with conventional layer thickness measuring devices when processing using the powder on powder method, as the primer would have to be measured before curing. Also, normal measuring devices can only measure the thickness of the entire coating structure and not the individual layer thicknesses.

In order to be able to measure the individual layer thicknesses, non-contact measuring devices (infrared, ultrasound, etc.) are recommended for measuring the primer layer thickness before curing. If this value is documented, the value of the top coat can be calculated after measuring the total layer thickness (total layer thickness - layer thickness of the primer = layer thickness of the top coat). If this measuring equipment is not available, it is still possible to measure "destructively": The easiest way to do this is to blow off the applied primer locally at certain measuring points and then apply the top coat. At the points without primer, the layer thickness of the top coat and the system layer thickness at the other points can be measured normally. The layer thickness of the primer can then be calculated (total layer thickness - layer thickness of the top coat = layer thickness of the primer). Alternatively, "wedge-cut coating thickness gauges", formerly also known as "Powder Inspection Gauge (P.I.G.)", are also available on the market. Here, the coating is cut into the substrate in a wedge shape. This creates a visible cross-section of the paint film. The layer thicknesses can now be easily read off using an accompanying magnifying glass with a measuring scale.