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Metallic Powder Coatings

Application Guidelines for Powder Coatings with Metallic Effects

Data sheet 36

This data sheet is intended as a guide for the applicator, informing the user on parameters that have considerable influence on the quality of the finish. Caution must be exercised when working with metallic effect powder coatings. Prior to application, the suitability of the entire coating system must be established by comparison with the powder manufacturer's reference samples. Otherwise no assurances can be given with regard to the color or metallic effect. The following recommendations are necessary for satisfactory results:

COLOR DEVIATIONS

Powder coatings are formulated and manufactured to meet color standards: i.e. the RAL standard. Despite the stringent quality control measures exercised during production, a complete **batch-to-batch consistency** cannot be guaranteed. For exact evaluation of color/effect, upon request, the manufacturer therefore supplies production panels of individual batches. **Batch-to-batch consistency** of products supplied is comparable to that of non-metallic powder coatings. Color deviations between two batches – depending on color – may with lighter shades be at approximately 1–2 Delta E, with darker shades possibly significantly more. However, application process and equipment are also factors in the final color/effect of the coating and have not yet been included in the above values. Evaluations according to the automotive industry standards are not admissible. An acceptance test must be performed on the actual application equipment before processing. Those color/effect variables, particularly with regard to share of **recycled powder**, must first be established via an upper and lower tolerance sample. To largely eliminate color/effect differences caused by the coating system, an entire coating job must be processed on the same coating line, without parameter fluctuations, preferably without interruptions and with consistent recycling percentages (guideline: 30%). **Manual coating** is likely to produce variations of color and/or effect due to inconsistent film thickness. Manual coating must therefore be adjusted to automatic processing with respect to color and effect. **Coating thickness** is of importance as variations will cause color/effect and gloss differences.

Color/effect variations inherent to metallic coatings are primarily linked to content of metallic pigments. Generally fine flakes of metallic pigment are used. Positioning of those flakes within the applied coat determines the metallic effect and color. Experience has shown that any **parameter of application** may influence the position of the flakes and thus also color/effect. It is therefore important that throughout an entire coating job all equipment is left at precisely the same settings. Coating one entire job with a variety of equipment should be avoided, or else considered only after exact adjustments and comparisons produce identical test results with different equipment. Separate tests shall be carried out in order to determine to which extent color changes are to be expected as a result of specific component geometries.

RECLAIM

To achieve a consistent color/effect it is important for the coater to establish **a ratio of virgin and reclaim powder** and adhere to this ratio during the entire coating process. The ratio of virgin powder should not fall short of 70%. Repeated or exclusive use of reclaimed powder is not advisable. Since not all metallic effect powders are reclaim-consistent, the virgin powder percentage must be established via **upper and lower tolerance samples**. A final quality inspection for color is still highly advisable.

APPLICATION EQUIPMENT

Different **powder coating guns, systems and spray parameters** are often the cause for varying results. It is very important to only work with nozzles suitable for metallic powder application. Depending on the type of object to be coated, powder should be applied with a flat-spray type nozzle or with an aerated impact disk, in an even cloud pattern. **Grounding** and **charging** of the powder cloud must be constantly monitored. **Interim cleaning** of the powder hoses and removal of deposits from powder guns and booths is also part of a regular process control. Metallic powder coating should exclusively be done from **fluidized powder containers**. Since metallic powder coatings react more sensitively to differing reclaim ratios, the coating should from the very beginning be at approximately 30% reclaim (initial coating without parts).

CHARGING

Generally very few metallic powder coatings are suitable for tribo application. Suitability must be established prior to a coating job. Due to the differing changing characteristics of powder coating and metallic particles not all metallic particles are transported to the part to be coated. This too can cause a variation in color/effect. Changing from electrostatic to tribostatic charging is not permissible. With metallic powder coatings a particularly clean coating system is very important in order to avoid short-circuiting in the gun area from powder deposits. Once again the importance of constant control over the charging of the powder cloud is stressed.

GROUNDING

When working with metallic powder coatings proper grounding of equipment as well as work piece is very important. This contributes to a high degree of **color/effect consistency**.

COATING DURABILITY

Generally the durability is determined by the processing system – one or two coat. The durability of a metallic powder coating is **product-specific** and therefore we recommend consulting the powder manufacturer prior to application, with particular reference to special requirements, such as wear and scratch resistance, cleaning recommendations, colorfastness and chemical resistance.

The manufacturer needs complete **information about all of the requirements** that the powder coating is subjected to in a project/application in order to give appropriate advice. This includes all materials that the coated part may come in contact with during final installation, i.e. glazing aids. In the case of materials of unknown chemical influence, tests must be performed after consultation with the coating manufacturer. This might necessitate a clear top coating to establish a barrier that prevents color/effect changes caused by those materials to the metallic coating. Please note established 2-coat curing parameters.

CLEANING

Cleaning of metallic powder coated materials must be performed at regular intervals and as quickly as possible after they get soiled. Dried and old dirt can only be removed by scouring, which means scratching of the powder-coated surface. It is highly advisable to follow the cleaning recommendations of the manufacturer.

GENERAL RECOMMENDATIONS

A primer should be applied on parts that are difficult to coat, since a subsequent touch-up job may produce clouding. When both sides of a finished part must be coated, the side most visual in its final use should be coated last. The **final orientation** of curtain wall panels on a building must be established prior to coating and all panels must either be coated horizontally or vertically to achieve the same color/effect throughout a coating project. Variations in the heat-up period are to be avoided: parts of **varying wall thicknesses** cannot be coated at the same time. Please observe and consult the powder coating-instruction sheet.

Working with metallic powder coatings requires precision. All stipulations of these guidelines shall be observed. What is most important is proper communication between the coater and the customer, and the coater and the coating manufacturer, to assure that all provisions are given for a quality finish.