

ENGLISH

Metallic powder-coatings

Application guidelines for metallic-effect powder coatings of Application Categories A-D
Technical Information Sheet 44

A B C D

**GENERAL INSTRUCTIONS FOR ALL METALLIC POWDER COATINGS:
(APPLICATION CATEGORIES A - D)**

This Technical Information Sheet aims to be of assistance to users when carrying out coating work and to inform them about the application parameters that have a significant influence on the coating results. Great care must be taken when applying metallic effect powder coatings, before application, the entire coating line must be reviewed for suitability. Please remember that there are several different application categories for metallic effect powder coatings (Categories A - D). To obtain satisfactory results, users must not only consider the processes preceding and following the coating operation, but should also observe the recommendations below.

The differences in colour / shade and effect occurring between metallic effect powder coatings are dependant on the proportion of metallic-effect pigments which they contain. The metallic-effect pigments used are mainly in the form of fine platelets. The metallic effect, and also the colour shade, depends therefore upon the orientation of these platelets in the paint matrix, as well as on the viewing angle and the light conditions. Experience has shown that all the application parameters have an influence on the orientation of the metallic effect platelets and thus upon the ultimate colour, shade and effect of the paint layer. Therefore when applying metallic-effect powder coatings, very great care must be taken to ensure that when a batch of work is being processed, no changes are made to the coating line parameters, except for lot and batch-related fine adjustments. Carrying out coating for one project on several different coating lines should be avoided, if this is not possible, then it is only permissible after the results have been very carefully co-ordinated and adjusted. The extent to which components with complicated geometry may lead to deviations in the colour shade and effect must be determined by systematic preliminary trials. Standardised assessment of metallic colour shades is carried out at the user in diffuse lighting at a viewing angle of 90°. Wherever possible, light booths (D65 daylight) should be used.

Even when work is processed with the very greatest care, differences in colour shade and effect between different batches are unavoidable. The potential differences in colour shade and effect between different batches of metallic effect powder coatings are somewhat greater than those found between powder coatings with no metallic effect. This difference does not take into account of any process and plant related deviations in the colour shade and effect at the coater. It is not permitted to evaluate the deviation with reference to automotive standards or any other standards or technical bulletins that have not been expressly agreed.

The colour shade/effect that is obtained is greatly dependent upon the coating line. Before processing, samples for quality testing should be produced. In order to minimise the plant related colour shade/effect differences, the entire coating job must always be applied by the same coating company on the same coating line, with as little interruption as possible and with constant machine parameters and a constant reclaim rate (guideline value is maximum of 30%). The uneven powder deposition that is a feature of manual coating means that greater variations in colour shade and effect must be expected when using this type of application.

To achieve a consistent colour shade/effect, the coater should define the ratio of virgin to reclaimed powder and constantly maintain this ratio throughout the entire coating process. The virgin powder content should not be less than 70 %, and it is not permitted to use reclaimed powder only. As not all metallic effect powder coatings have equal reclaim stability, the proportion of virgin powder must also be defined in each case by way of colour-shade/effect upper and lower limit samples. Quality inspection for colour-shade/effect consistency is absolutely essential during the coating process.

Uniform coating thickness must also be ensured: excessively large differences will cause variations in colour shade/effect and gloss level. To prevent surface defects (e.g. specks) which may occur in thinner layers due to the size of the effect-creating pigments (e.g. sparkling effects), a coating thickness of at least 70 µm is advisable. Contact the powder-coatings manufacturer if in doubt.

Different types of powder coating gun, coating lines and process parameters are often responsible for varying results. Depending on the type of object to be coated, a flat-spray nozzle or aerated deflector should be used, working with a uniform powder cloud (recommended powder output: approx. 150g/min per gun). The necessary regular process supervision will also include intermediate cleaning of the powder hoses, and the removal of deposits from the powder gun spray cones and from inside the booths. When using metallic-effect powder coatings, very special care must be taken to keep the coating line clean, so as to prevent powder sintering, and the short circuiting which this would cause near the gun. It is very important to check regularly that the powder cloud has sufficient electrostatic charge. We recommend using fluidised bed powder containers for metallic effect coating.

When using metallic effect powder coatings, ensure that the powder coating line and the object to be coated are both sufficiently earthed (grounded). This makes a significant contribution towards achieving a consistent colour / shade.

Very few metallic effect powder coatings are suitable for tribostatic spraying and their suitability must be verified by testing on the coating line prior to being used. Due to the different charging characteristics of powder coating and metallic particles not all metallic particles are transported to the object to be coated. This, too, may result in a shift in the colour shade/effect. It is not recommended to change between electrostatic and tribostatic charging for the same job.

Difficult to coat parts should be pre coated prior to automatic coating. Subsequent touching up after automatic application may cause "clouding". With components which are coated on both sides, the more visually exposed side should be coated last.

**INSTRUCTIONS FOR APPLICATION CATEGORY B:
METALLIC-EFFECT POWDER COATINGS WITH SLIGHTLY EXTENDED PROCESS CONTROL**

With this category, the following points must also be observed in addition to the general instructions:

All process parameters (e.g. type of coating line, gun settings, stoving parameters, conveyor speed) should be laid down in writing for the first coating job and must then be reused unchanged for all subsequent lots, except for lot- and batch-related fine adjustments. During the coating operations, regular checks should be made, and documented, to ensure compliance with these parameters. Correct earthing, and the charging of the powder cloud, must also be checked regularly. When curing the coated parts, differences in the heat up rates should be avoided.

Complex component geometries must be pre coated prior to automatic coating as subsequent touching up may lead to differences in colour shade/ effect. The intended orientation of curtain-wall panels (on a building – vertical or horizontal) must be defined prior to coating and must not be changed during the coating job.

It is advisable to create colour limit samples for use in in-process quality control of colour shade/effect. We recommend having these approved by the client prior to the commencement of a project.

Wherever possible, each single coating order should be processed in a single lot and with a single batch of powder. If a coating job or building coating project necessitates follow-up (production) orders for powder, then a batch specific follow up order will be required.

**INSTRUCTIONS FOR APPLICATION CATEGORY C:
METALLIC-EFFECT POWDER COATINGS WITH EXTENDED PROCESS CONTROL**

In addition to the general instructions and the instructions for Category B, the following points must be observed:

All process parameters (e.g. type of coating line, gun settings, stoving parameters, conveyor speed) must be laid down in writing for the first coating job and then replicated for all subsequent lots, except for lot- and batch-related fine adjustments. These parameters must all be documented, without exception.

Upper and lower limit colour standard samples must be created for use in process quality control of colour shade/effect. We recommend having these approved by the client in writing.

Before commencing full scale production coating, it is strongly recommended to prepare a representative pilot series / mock-up sample area under production conditions and to present it to the client for written approval in such a way as to give the client a realistic impression of the final appearance of the facade in question. Allowance must also be made here for the naturally fluctuating light conditions and other circumstances affecting the object. This mock up sample must be prepared under the same conditions as those applying to subsequent production coating.

**INSTRUCTIONS FOR APPLICATION CATEGORY D:
APPLICATION-SENSITIVE METALLIC-EFFECT POWDER COATINGS**

In addition to the general instructions and the instructions for Categories B and C, the following points must be observed:

With this category of metallic effects, big differences in colour /shade and effect may occur. Even when the very greatest care is taken, it is not possible to expect a consistent coating result.

OVERVIEW OF THE MAIN REQUIREMENTS APPLYING TO APPLICATION CATEGORIES A – D

	Category A	Category B Effects with slightly extended process control	Category C Effects with extended process control	Category D Application-sensitive effects
Inbound technical quality testing	Compulsory	Compulsory	Compulsory	Compulsory
Specifying boundary samples	Recommended	Recommended	Compulsory	Compulsory
Recording the process parameters	Recommended	Recommended	Compulsory	Compulsory
Pre-coating of workpieces having complicated component geometry	Recommended	Compulsory	Compulsory	Compulsory
Preparing a mock-up sample, depending on the size of the project	Recommended	Recommended	Strongly recommended	Compulsory
Project-specific order	Recommended	Compulsory	Compulsory	Compulsory