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APPLICATION GUIDELINES FOR METALLIC EFFECT POWDER COATINGS

Metallic effect powder coatings manufactured by HMG Powder Coatings Limited are often a blend of specially designed powder base with a variety of carefully chosen metallic effect pigments. Unless specifically noted on the product description, the special effect pigments are not physically fused ('bonded') with the base coating and therefore there are some additional measures that must also be considered before successful application. The requirements and the control over the application process include all of those measures currently used in coating standard powder coatings. There are however, a number of additional measures which must also be implemented to successfully apply these products, namely:

PLANT SET-UP

Owing to their consistency of application, automatic guns will give a better finish than manual guns when applying metallic powders. For this reason when coating large panels/pressed metal, automatic guns are the preferred method of application. We would advise that the gun to object distance is kept at approximately 200mm (8 inches). With automatic application, manual touch-in may be used for difficult areas, but should be carried out prior to the automatic application. The minimum area possible should be sprayed manually.

To reduce the possibility of 'striping' the speed of the reciprocators must be kept at or above the level used for standard colours, and at least two reciprocators per side should be utilised to give a consistent finish.

Care must be taken when manual application is used as the main application technique. The distance between the gun and the workpiece must be kept constant as it will have an effect on the degree of metallic content in the finished coating. The closer the gun is to the workpiece, the more metallic the appearance. This is due to the effect of gravity on the metallic composite particles. It is recommended that when spraying manually the distance of the gun from the workpiece should be approximately 150mm (6 inches). Experienced sprayers should be used wherever possible.

Gun nozzles must be monitored regularly throughout the application. Any build-up of metallic particles must be removed. It is recommended that slotted nozzles are used on the automatic guns as they give a wide spray pattern and thus reduce the possibility of striping. Either slotted nozzles or deflector/cone nozzles can be used on manual guns (dependent upon the type of work being coated).

Owing to the high specific gravity of some metallic effect pigments, particularly gold/bronze pigment, adjustments to the settings of the fluidised bed may be required. It is important that the powder fluidises well as it may affect the appearance if the heavier (metallic composite) particles are allowed to collect near the bottom of the fluidised bed. The degree of fluidising should be checked regularly during a production run. It has been found that the fluidised beds are generally better than box-feed systems when processing metallics. Box-feed systems do work but need to be monitored carefully to ensure that fluidisation is occurring. Wherever possible, we would recommend that fluidised beds are utilised.

kV settings should be kept as normal if possible. Raising the kV may increase the 'degree of metallic content', but not to the same degree as changing the gun to workpiece distance. If the kV is too high, there is more likelihood of a build-up of metallic particles on the gun nozzle.

Electrical earthing is vitally important when spraying metallic effect coatings. Ensure a low resistivity (<1MΩ, ideally <500kΩ) between gun and part and gun and earthing point. Avoid daisy-chaining parts.

PRE-BATCH SAMPLES

Due to the nature of all metallics, different application conditions will result in a different appearance being achieved. Prior to starting any job, the applicator must ensure that the required appearance can be achieved. To ensure that the plant is set up correctly reference samples of each component to be used on the contract should be coated and checked against a

master colour standard supplied by HMG Powder Coatings Ltd. Where a large number of different components are to be used the applicator should choose those which best represent the variation across the job regarding complexity of design.

The coated components should then be submitted to the contract administrator for approval prior to the job starting. Duplicate samples should also be retained by the applicator. These components in conjunction with the HMG master colour standard must be used as quality standards for the duration of the contract.

The plant set-up for coating the pre-batch samples should be identical to the proposed plant set-up used for coating the actual job. Plant parameters (gun settings, reciprocator speeds, track speed and gun-to-object distances) should be recorded during the processing of pre-batch samples. These parameters should then be used for coating the job.

PROCEDURE FOR PROCESSING WORK

The plant parameters which were utilised during the processing of the approved pre-batch samples should be used to process one flight bar of work. Production should then be stopped until the appearance of the work has been checked against the pre-batch samples. On panels and large sections, inspection to include visual assessment from 5m and 10m at various angles in natural daylight, to confirm uniformity of finish.

If this work is satisfactory, then the whole job can be processed. If the appearance of the pre-batch samples cannot be reproduced then adjustments need to be made to the plant set-up (see "Trouble Shooting Guide" below). Assuming that the necessary appearance can be achieved the plant settings should be recorded and these settings should be used for all future production runs of the same product.

An increased level of inspection is required when processing metallics to ensure that the appearance remains consistent throughout the production run(s). Regular visual checks should be made and wherever possible coated components (or off-cuts) taken throughout the job should be used as reference standards to ensure that the appearance does not alter as the job progresses. Again, for panels and large sections, inspection to include visual assessment at 5m and 10m in natural daylight at various angles to confirm uniformity of finish.

For bonded products only, a maximum of 25% reclaim powder should be used to ensure colour consistency. Since all metallic effect powder coatings react more sensitively to differing reclaim ratios, it is recommended that the coating should from the start contain 20-25% reclaim.

For non-bonded products, the powder should only be sprayed to waste.

For all cases, a final quality inspection for colour is highly advisable.

TROUBLE SHOOTING GUIDE

As previously stated, the plant set-up is very important when applying metallics and differences which may not have an effect on solid colours will certainly be noticed with metallics. The following list of problems and solutions should assist in setting up the plant.

Picture framing

This occurs when metallic particles build up around the edge of a component, which gives the edge a different appearance to the rest of the component it is usually caused by inconsistent application techniques.

If automatic guns are being used, the reciprocators should be set so that they do not 'dwell' opposite the edge of the panel at the top and bottom of the stroke. Further to this gap between components the track should be kept as small as possible.

If manual application is being used, the spray action should be consistent and very high film thickness should be avoided.

Spurting

This occurs when either metallic particles build up on gun nozzles, when fluidisation is inconsistent, or when powder/air setting are incorrect.

Gun nozzles should be regularly monitored and cleaned where necessary. The fluidised bed settings should be monitored to ensure good fluidity. Higher than normal air pressures may be needed in the fluidised bed as metallics may have a higher gravity than solid colours.

Metallic Effect Powder Coatings

Striping

This occurs when the reciprocator speed is too low, when an incorrect gun nozzle is used, or if manual application is being used where the spraying action is inconsistent. To eliminate the problem, the reciprocator speed should be increased slightly and the gun nozzles checked to ensure that the slot is correctly orientated, i.e. horizontal to give as wide a spray pattern as possible. If spraying manually, the spraying action should be changed. In some circumstances the effect can be reduced by increasing gun to workpiece distance.

Patchiness

This occurs when an insufficient number of guns are used (Automatic application) or when the spraying action is inconsistent (Manual application). There should be a minimum of two automatic guns per side to give a consistent appearance. The gun to workpiece distance should be kept constant (approximately 150mm for manual guns, 200mm for automatic guns).

Low metallic content in finished coating

This occurs when guns are too far away from the work, or then the kV is too low. Moving the guns closer should be the first alternative, with the KV being increased as a second step. In both cases, the situation needs to be carefully monitored to avoid 'orange peel' caused by high film thickness or back ionisation, both of which may cause the work to be rejected.

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