

Metallic effect powder coatings

General

Axalta Metallic Effect powder coatings are modern powder coating grades that are used to create appealing and attractive metallic effects on materials.

This broad and growing range of products may also provide interesting alternatives to conventional surface finishes in outdoor architecture.

Axalta Metallic Effect powder coatings stand out with their great brightness, optical depth and fascinating colour effects under changing light conditions. This phenomenon known as "metallic flip" enhances visual appeal of these powder coatings.

Produced from highly-quality special effect pigments, the appearance of Axalta Metallic Effect powder coatings depends on many parameters such as type and quantity of metallic/mica pigments, metallic process (dry-blend, bonded), observation angle, basecoat....

It is important to mention that even though special procedures and rules have been set up to maintain a certain batch to batch consistency, the formulation and reproducibility of metallic effect powders in production is more difficult than for smooth solid colours, leading to possible small variations between batches.

Bonding & dry-blending are common processes used to obtain metallic effect powder coatings. While dry-blending involves blending effect pigments and powder basecoat together (metallic particles are free from the basecoat leading to some possible product instabilities), bonding process involves bonding effect pigments to powder particles at a controlled temperature, helping to improve the stability of the final powder.

Once manufactured, the final appearance of Axalta Metallic Effect powder coatings might also depend on the process and the spraying conditions

- earthing
- charging equipment, corona or tribostatic, from various manufacturers
- hopper, level of powder
- guns settings kV/ μ A (lower settings can give a more metallic appearance in general)
- type of nozzles
- powder reclaim
- spraying distance, object orientation, stroke directions

Axalta shall not be liable for difference in colour shades resulting from the use of effect colour powder coatings.

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Once defined, these settings and parameters should remain as consistent as possible and regularly controlled.

This technical document is intended to help the user to apply these coatings.

Because of the possible influence of many parameters on the final result, care must be taken to keep the process and spraying conditions as stable as possible for each job, even more so if several phases will be done for the same job.

In this regard, we advise using a single batch of powder to coat the whole job.

Despite the great care taken during our manufacturing process, some small batch to batch variations may occur. These variations could lead to visible differences in color and appearance when parts coated with different batches of powder are subsequently fitted together. Furthermore, if the job is extended at a later date, or parts are refurbished, we recommend that the color and appearance of new parts are checked carefully to ensure that they are an acceptable match to the existing ones.

If a new follow-up order concerns an extension of work, please indicate the previous batch number used (production number) to Axalta to evaluate the feasibility. A subsequent check on the customer production line is mandatory to confirm suitability.



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Tips for users

As a general advise, it is better to avoid coating for the same end-use on different coating lines or at different job coaters. But, if it is likely that several batches of coating are to be used for a very large project, we recommend you to prepare an adequate number of master samples at the production plant. These samples will serve as reference samples if various parts of a project need to be coated at the same quality through different lines.

Process:

- Earthing of parts to be painted must be as good as possible and checked regularly to avoid application issues and differences in the appearance.
- It is important to notice that metallic powder coatings must be used with a feed system to maintain a proper homogeneous fluidized bed, level $\frac{3}{4}$ high, in order to avoid possible separation.
- Settings must be adjusted to achieve the right appearance; as a guide we recommend working with constant 80 kV high voltage while the pressure should be adjusted according to the part to be painted.
- Super corona counter electrodes are usually used to increase the flow of the film on large flat surfaces but are not recommended when applying metallic powder paints because they tend to modify and reduce the electrostatic field and this can influence the final appearance. In case of use, a prototype must be produced for customer approval to validate the appearance.
- Best coating results are obtained with an automatic system and a distance between spray guns and parts at least 25/35 cm.
- If objects have two or more primary faces and the spray guns are offset, this can result in effect variations, for instance due to major differences in the distance between guns and items to be coated. Ensure alignment of the items if possible.
- The speed of the line should be adjusted according to the number of spray guns, the distance between spray guns and parts, the type of nozzles and the reciprocator speed (W adjustments) in order to avoid shading/clouding.
- Manual application might be irregular, leading to variation in the appearance. If the part to be painted is complex (requiring pre touch-in with a manual gun prior to automatic application), we encourage making a preliminary trial to qualify the appearance and establish all parameters before starting the job. Post touch-in (with a manual gun after automatic application) is not recommended.
- The pre touch-in stage must start with difficult areas to be painted like welds, Faraday cage effects etc. The automatic stage allows the film thickness and final aspect to be harmonised.
- When automatic application is not possible (only manual), the operator should start by spraying the difficult areas and then increase the distance between part and gun to harmonize thickness and aspect in order to avoid clouding.
- Whatever the process, the film thickness should be as uniform as possible to limit colour variations.
- Tribostatic and corona equipment, but also equipment from different suppliers, might lead to possible difference in the final appearance, so we recommend that one single equipment type is defined and used for each job.
- Aspect/colour might be influenced by reclaiming the overspray; care must be taken to ensure an appropriate ratio (maximum 30% for bonded products, depending on the contrast and metallic aspect – please contact your local representative for advice). Reclaiming should be automatic. Good practice is to work at “constant level”, which means having a large quantity of powder in the hopper. Best practice is to use 3 hoppers, one for virgin powder, one for reclaimed powder and the last one for the blend at the right ratio.

In any case, a frequent visual inspection is necessary when reclaiming the overspray to validate the colour and appearance.

- Once defined, parameters and settings should be recorded for future applications.



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Controls

- It might be necessary to regularly clean the nozzle and the electrode or to use the air cleaning function if included onto the corona equipment.
- Once process and settings are fixed, we recommend that the appearance is monitored/controlled by frequent visual inspection in a light adapted control area with a sufficient inspection distance of approximately 3 to 5 meters (to see cloudy effects) as parts leave the oven, in order to be able to react quickly in the event of excessively large differences in colour (**check in comparison to an agreed standard**).
- We advise that a pre production sample is made to qualify settings and appearance before coating the whole job and for big projects we recommend making a prototype for customer approval before starting the work.
- **Spraying on primers:** since the 2nd layer is usually sprayed at a lower voltage to prevent repulsion, a pre test is recommended to validate the appearance and when settings are fixed, make sure regularly that the appearance remains acceptable.

Dry-blended Metallic effect powder coatings:

The main difference between dry-blend and bonded products is that **reclaiming of dry-blended metallic powder is not recommended** because of possible separation between effect pigments and basecoat during the reclaiming process, increasing the risk of variation in the colour or appearance.

Moreover, since the metallic pigments are free from the basecoat, the charging effect of both metallic pigments and basecoat particles is different, increasing the risk of variation in the colour or appearance with the settings, the earthing, the equipment ...

For dry-blend products all previous recommendations must be followed (except reclaiming) with extra special care on controls.

	Dry-blended products	Bonded products
Project specific order	A single batch whatever the project	A single batch per project for parts assembled together In case of a new order for an extension of work, consult Axalta for feasibility/advices (previous batch number requested) Mandatory check on customer line is necessary
Reclaiming	Not recommended	Up to 30% (depending on the contrast and metallic aspect) with adapted equipment
Hopper	Yes	Yes
To define and register the settings	Yes	Yes
Feasibility pre test	Yes, critical	Yes, critical for part with complicated geometries
Process follow-up/controls	Yes, critical	Yes, critical
Prototype for customer pre approval and specified boundary samples masters	Yes	Yes, for large project, extension of job ...

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