

TECHNICAL ADVICE

Recycling (reclaiming) Powder Coat Overspray



The DGL Tech Advice Series provides information, hints, tips and links to further advice for key processes involved in the preparation, application and after care maintenance of powder coating projects.



This Tech Advice document outlines the process of recycling (reclaiming) oversprayed powder coatings in the application process and details ways to help ensure successful powder coat recycling.

What is recycling powder coat overspray and why recycle it?

One of the significant benefits of powder coatings over other types of finishes is the ability to collect and reuse the oversprayed powder that doesn't initially adhere to the items being coated. Under controlled conditions, recycling overspray in this way can in fact achieve over 95% recovery if the system is optimised.

When applying powder coatings for extended periods of time with the same product, recycling can present considerable production efficiencies. And as an environmentally friendly waste solution, it's well worth considering if powder coat recycling is suitable for your application process.

What equipment is required?

There are various equipment configurations for recycling powder, the most common being reverse pulse dust collectors coupled with a cyclone. These recycling systems can be fully automated, semi-automated or manual with varied levels of waste and risk to quality associated as outlined below.

Please seek the advice of your equipment supplier for any system upgrade requirements.

System Type	Recycling System Overview	Efficiency	Quality Control Risk
Fully Automated		Excellent	Very Low (system managed)
Semi Automated		Very Good	Low (system/employee managed)
Manual		Good	Moderate (employee managed)

Hints and tips for successful powder recycling

Striking the right balance of recycled vs fresh (virgin) powder

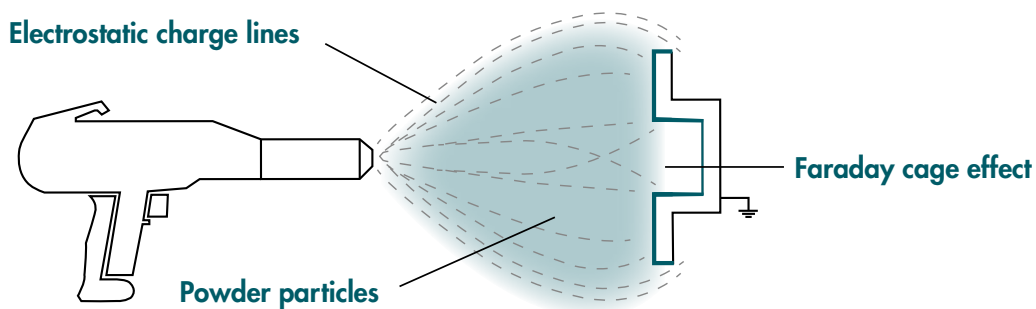
As the particle size of recycled powder is generally finer than fresh powder, care must be taken to maintain an optimal balance between the two and control the particle size distribution (PSD). Finer particles have different electrostatic charge characteristics than standard size particles so if the ratio of reclaim powder introduced into fresh powder is too high, application and appearance issues can arise.

In automatic recycling systems, the rate of recycled powder mixed with fresh (virgin) powder is carefully controlled. For systems where recycled powder is added manually, it's important the powder is added at regularly timed intervals at a consistent addition rate no greater than 1 part recycled powder to 4 parts fresh powder.

Issues caused by adding too much recycled powder to fresh powder

Poor or reduced recess penetration

This is commonly referred to as the Faraday cage effect. This effect occurs when charged powder particles create resistance on the outer edges of a metal profile making it difficult to penetrate inner recesses or corners resulting in low coverage of these areas.



Reduced powder adhesion prior to the oven

Powder that's sprayed on to an aluminium or steel substrate adheres by electrostatic adhesion. The powder can be dislodged if wiped with a cloth or brush. Under normal circumstances, the electrostatic adhesion is powerful enough to hold the powder on the surface until it reaches the oven where it melts and cures to form a very strong adhesive bond to the substrate. If there are too many fine particles from the addition of excess recycled powder, the powder may dislodge from the surface before entering the curing oven.

Reduced transfer efficiency

Generally, over 70% of fresh powder sprayed at a substrate will adhere or transfer to the targeted surface if earthing, jiggling and line density are optimised. This transfer efficiency may be adversely affected however if the ratio of recycled to fresh powder is too high. This is due to the different electrostatic characteristics of finer particles, which are more prevalent in oversprayed powder.

Low or uneven film builds

A reduction in transfer efficiency caused by excess reclaim can result in reduced recess penetration, poor flow and dry film builds that do not meet minimum recommended standards.

Oversize inclusions in the cured film

The recycled powder may contain contaminants from the powder booth and powder recovery system, so it's essential that visual QC checks are performed regularly. It's also strongly recommended that the captured overspray is sieved through a suitable sized aperture (e.g. 150µm) in order to remove any oversize particles prior to recycling.

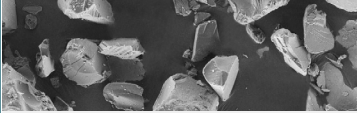
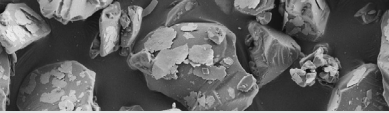
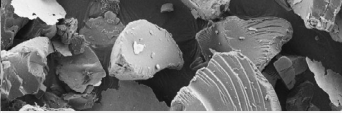


Recycle advice for pearlescent finishes

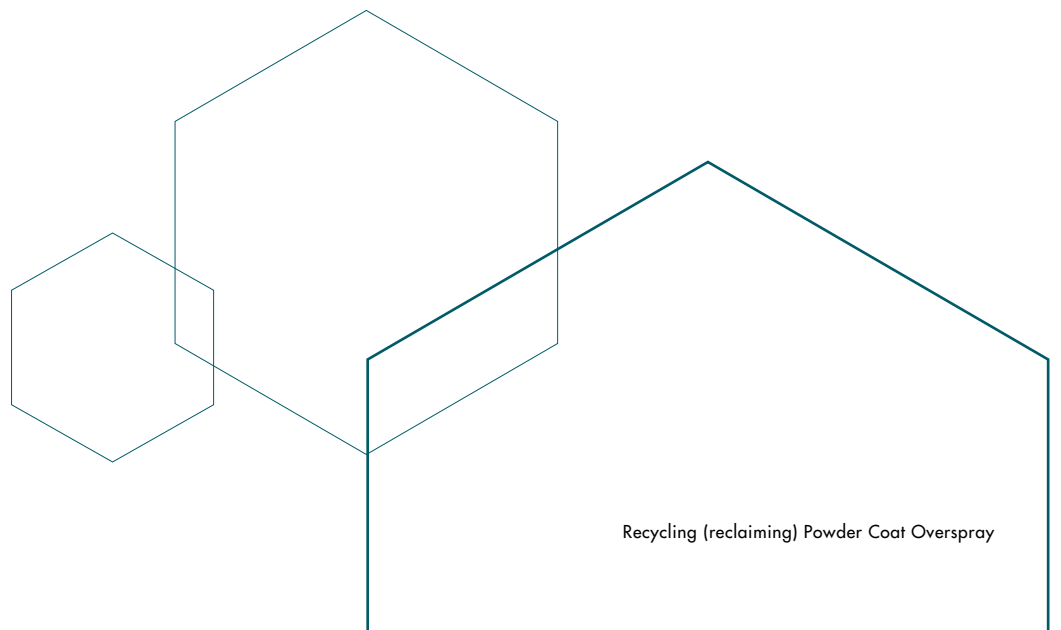
(e.g. Fluroset Allure, Duratec Eternity)

Extra care should be taken when recycling overspray from pearlescent powder coatings as the different compositions of bonded and blended powders may have a significant impact on likely success rates. The table below outlines the different powder coating manufacturing and composition types.

Recycled pearlescent powder, particularly of a blended composition, may end up with a disproportionate amount of pearlescent particles. Cyclone systems are potentially more likely to separate or remove finer pearlescent particles and this may affect the final film appearance if addition rates of recycled to fresh powder are too high.

Composition	Solid Colour	Pearlescent - Bonded/Kinetic	Pearlescent - Blended
			
Description	Solid colour powder coatings do not contain any pearlescent or metallic pigments.	Bonded or kinetic powder coatings contain pearlescent and/or metallic pigments that are bonded on to the powder particles.	Blended powder coatings can contain pearlescent and/or metallic pigments which have been added to a solid colour and then tumbled in a blender to create a powder with a pearlescent effect.
Quality Control Risk	Low	Low - Moderate	High
Recycling Advice	Oversprayed powder from solid colours can be recycled at maximum levels.	Oversprayed powder from bonded products can generally be recycled at maximum levels.	Oversprayed powder from blended products can be recycled with caution.

To check the DGL powder coating composition type by product, download the DGL Reclaim Product Composition Listing available at dglpowders.com/tech-advice



Advice line

Our dedicated consultants can help simplify the specification process, saving you time and money by providing the right coating advice for your project.

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