ORGANIC finishing

BY BOB CREGG, SENIOR MARKETING DIRECTOR – BUILDING PRODUCTS, SHERWIN-WILLIAMS CO.

Powder Coating 101: Top 10 Field Issues – and How to Rectify Them

Powder coatings have become the finish of choice in industries ranging from heavy equipment to electronics and from outdoor recreational products to appliances. Key advantages that powder coatings have over liquid coatings include a solvent-free workplace, lower overall line costs and ease of cleanup. Powder coatings also can help finishers with their sustainability efforts, as they have zero to very low VOCs and offer overspray recycling capabilities and product waste that can generally be disposed of in conventional landfills (applicable regulations should be checked for proper disposal methods).

Proper maintenance and spray techniques are essential to ensuring efficiency and effectiveness in any powder coating process. Falling into bad habits is easy and often goes unnoticed, but can result in efficiency losses and quality issues. And while supervisor benchmarking of operations is a great best practice for keeping a line running as smoothly as the day it was first installed, even the most productive powder coating lines can experience issues.

When it comes to getting the most of powder coating, the issues listed below are not the only ones that need to be addressed. However, they are certainly 10 of the most common. Proactively identifying potential problems before they occur can save time and money.

Figure 1. "Cloud" phenomenon: what happens when too much powder is sprayed into the ion cloud, or when it is sprayed at too high a velocity; the powder will not pick up a charge as efficiently and uncharged powder will drift around the booth.

1 A Well-Grounded Recommendation. Most electrostatically

sprayed powder coatings are given a negative charge out of the powder gun, while the part itself is grounded. This ground provides the opposite charge and attracts the powder to the part, but the part itself must be properly grounded for this to occur. A poor ground affects the transfer efficiency and results in improper film build. Proper maintenance practices can help to prevent this from occurring.

For example, poor film build may be caused by "dirty" hooks — those insulated by powder buildup over time. The hooks must be kept clean — or replaced if they are beyond the point of being cleaned. The number of passes a hook can make after cleaning will vary. Periodic checks of the ground will help to determine the proper cleaning schedule.

Also, good contacts must be maintained throughout the system. The conveyor line from which the parts hang should be separately grounded to ensure that proper ground gets to the part. Non-conductive contacts may develop as a result of poor maintenance practices, reducing or eliminating ground and thus preventing powder from being attracted to the part. To confirm proper resistance, a 500 volt megaohm meter should be used, and the resistance value should be < 1 megaohm.

2 More is Less. The key to quality powder coating is to spray just the right amount of powder with the minimum amount of air necessary. Excessive feed air pressure and powder volume will not result in faster or better coated parts, and generally speaking, the finish, the spray guns and the booth may be compromised as a result.

If so much powder is being blown that the far end of the spray booth can't be seen, it's likely that too much powder is being conveyed through the gun. A typical powder gun utilizes an electrode at the end of the gun tip to emit negative ions into the air. The powder coating is then sprayed through the ion cloud that is created, developing the negative charge. When too much powder is sprayed into the ion cloud, or when it is sprayed at too high a velocity, the powder will not pick up a charge as efficiently and uncharged powder will drift around the booth (see Figure 1). A powder gun works most efficiently with an even, soft stream of powder coming from the gun nozzle – allowing the powder to pick up the proper charge and adhere to the part.

While some wear on the pumps and spray gun parts is expected, blowing air at high velocity generally leads to premature wear and, potentially, impact fusion (fused grains of powder that fly from the gun as an already-cured mass that cannot be re-melted). System components and parts should be inspected regularly for wear and replaced when necessary to maintain efficiencies and finish quality. Powder supply lines to the guns should be free of kinks and have minimal bends. The gun should be cleaned at least as often as the manufacturer prescribes and potentially more often if operating under harsh conditions. The cost of properly maintaining equipment is far less than the potential losses that often result when maintenance is ignored. The desire to speed up a line and try to increase output must be tempered with the reality of the equipment's capabilities. Optimal pressures can be set by regular consultation among the line's applicators and technical service personnel from the powder coating and equipment manufacturers.

3 Clean Air – Act! The importance of air quality to powder coating should not be underestimated. Many of the problems experienced in a powder coating spray installation can be directly traced to poor compressed air quality.