Powder Coating Reclaim Considerations

The advantages of reclaiming overspray powder are well known. The technology is proven and simple to implement. In some cases—for instance, single color operations—deciding to reclaim requires little, if any, forethought. However, in those applications where numerous colors or powder formulations are used, this issue becomes more complex. What can further complicate this issue is when there are one or more predominant colors that, at first glance, may appear to be prime candidates for reclaim.

Because the technology of powder reclaim is highly publicized by the industry, many potential end-users get trapped into purchasing reclaim systems by the equipment salesman without being fully informed of the cost impact of this decision. To illustrate this, let’s look at a few considerations.

The most important fact that is overlooked in planning a reclaim strategy is that it is not how much powder you spray, but how much overspray powder will you reclaim.

Equipment Options

Reclaim systems are designed to match the type of booth being used and come in two varieties. Cartridge collector technology is the most popular of the powder coating reclaim systems and utilizes dedicated cartridge collectors to reclaim individual colors or powder formulations. Changing the cartridge filters within a collector is impractical for color change. In addition to the collector, there are bulk powder transfer pumps, sieves, receiver tanks, gun feed hoppers, gun feed pumps, powder feed hoses, hopper level probes, and control packages that must be incorporated in this design to make it a fully functioning automatic reclaim system.

The second type of powder coating reclaim system utilizes cyclone technology. Since these systems are “self-cleaning,” they use one or more cyclones to reclaim all the individual colors or powder formulations sprayed in a particular booth. In addition to the cyclones, there are transfer receptacles, bulk powder transfer pumps, sieves, gun feed hoppers, gun feed pumps, powder feed hoses, hopper level probes, and control packages that, like the cartridge system, must be part of a complete and automatic reclaim system.

Transfer Efficiency Considerations

The most important fact that is overlooked in planning a reclaim strategy is that it is not how much powder you spray, but how much overspray powder will you reclaim. The amount of overspray generated is directly proportional to the first pass transfer efficiency of the spray system. First pass transfer efficiency is dependent on the products being coated and the spray equipment used. According to PCI®, normal ranges for first pass transfer efficiencies are as follows:
• Simple Flatware parts and Inside Box Shapes = 60%
• Large Parts = 50%
• Small Parts On Hanging Racks or Complex Parts = 40%
• Wire Goods With Very Little Surface Area = 25%

These efficiencies do not reflect the type of spray equipment that is used in the system. For instance, the first pass efficiency of automatic guns is heavily dependent upon the hanging density of the parts on the conveyor line. Manual application can often have better first pass transfer efficiency than automatic guns because sprayers can better direct the powder to the part. Gun triggering and profiling systems can improve automatic application efficiency, as well. Therefore, the PCI® first pass transfer efficiencies must be modified based upon the following equipment factors:

• Automatic Systems ⇒ add 0%
• Automatic Systems With Automatic Triggering and/or Profiling ⇒ add 10%
• Manual Spray Systems ⇒ add 20%

Using these factors, calculating the amount of overspray powder for a typical system is as follows:

Spraying 100 lb. of powder manually to coat flatware parts will generate:

\[100 - (100 \times 0.80) = 20 \text{ lb. of overspray powder.}\]

Simple Mathematics

Determining if a particular color is worth reclaiming becomes a simple math problem. For instance, if you are going to spray 5,000 lb. of one color powder per year and you are using manual guns on flatware type parts your overspray will be 1,000 lb. per year. Assuming a powder cost of $3.50 per pound, it will take approximately 7.1 years to save enough money to purchase a $25,000.00 cartridge collection system. In most companies this payback is not acceptable, unless this is the only color that this system will be spraying. A more accurate cost of powder savings can be calculated to include cost of disposal and other issues that are important to a particular facility.

Reclaim Economics in Existing Systems

Determining when you should perform a complete color change to reclaim powder in an existing system should be driven by the same cost accounting techniques as purchasing a powder reclaim system. In this case, the cost of performing the color change should be evaluated against the amount of powder that will be collected. For instance, let’s look at the following example:

Let’s assume it takes two men one hour to perform a color change in a particular powder system. Based upon their labor rates, overhead, lost of production time, energy...
cost of an idling system, etc. this translates to $400. The next color is scheduled to run for two hours and the overspray powder is estimated to be 75 lb. at a cost of $3.50 per pound. Therefore, the estimated savings would be calculated as follows: (75 x $3.50) - $400 = (-$137.50). Another way to look at this is you must spray this color for over three hours to economically justify performing the color change.

Once you have considered equipment options and transfer efficiency, done the simple math, and looked at reclaim economics in existing systems, you are better able to decide if reclaiming powder is right for your operation.

Nick Liberto, P.E., is president of Powder Coating Consultants, division of Ninan Inc., an independent technical consulting firm in Bridgeport, Conn. He can be reached at pcc@powdercoat.com.