# Ask the Experts

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Your questions answered by PCI member experts.

*You have questions, we have answers. In each issue of* PCT, *our extensive network of powder coating experts provides information to help you with your powder coating challenges. Let us know what's keeping you awake at night, and we'll do our best to help you get a good night's sleep!*

## Bath Time

***We have been operating our powder paint line for several years. Like most companies, we have been running the line but have now had some turnover and training has become more difficult. Someone asked if we had documented standard operating procedures for our pretreatment system. However, these feel burdensome. Why are they important to our powder coating process?***

Standard operating procedures (SOPs) are essential for maintaining the quality and safety of your chemical baths. These procedures should be developed in collaboration with your chemistry supplier and tailored to your specific system capabilities.

SOPs outline the manufacturer's intended use of their products and provide guidelines for assessing material quality. Testing standards may include parameters such as color, smell, pH, viscosity, and titration to determine the correct solution concentration. It's crucial for paint and pretreatment suppliers to offer regular training for operators and managers to ensure everyone can perform, interpret, and respond to test results effectively. Maintaining records of these results may also be required by customer or manufacturing auditors.

Routine parameter testing is vital for maximizing product effectiveness. If results fall outside recommended limits, specification testing serves as an early warning, enabling prompt corrective actions. Adhering to SOP parameters also promotes workplace safety. Using chemicals beyond their specified range can create hazardous conditions. For instance, chemicals used in metal pretreatment often contain reactive acidic or alkaline substances. Maintaining the stability of these products ensures proper substrate processing and a safe work environment for employees.

## Learning Curve

***I have started a new powder coating operation after having done liquid coating for many years. While still learning about applying powder the most efficient way, I wanted to learn if I can repair powder coating defects. What do I need to consider doing this properly?***

Transitioning from liquid coating to powder coating can indeed present a learning curve. Repairing defective powder coating can sometimes be costly, so your first step should be to evaluate whether the part is worth repairing or if it should be scrapped. If repair is the most viable option, selecting the appropriate method is crucial for achieving a satisfactory result.

If the defect is a large area, the best method would be to strip the entire part. This can be accomplished via blasting, chemical stripping, thermal stripping, or with a fluidized sand bed. After the part is stripped, then the part can be coated as if it was a new part. If it is a small spot repair, the defect can be sanded to a feathered edge, wiped clean with water or a solvent, and recoated.

If you encounter any specific challenges or unique issues, consulting with the powder coating manufacturer or a professional in the field can provide additional guidance.

## Thermophobia

***Our company is introducing a new product made with a lightweight plastic composite material. We want a finish that is both protective and decorative. We are very sensitive to environmental, climate, and cost of energy issues and have ruled out solvent and water-based paints. The material will deform at 280 degrees Fahrenheit, so thermoset powder coatings are not an option because of high melt temperatures and long melt times. Is ultraviolet (UV) cured powder coating a possible finishing material for our product?***

The key question to ask is, "At what temperature does the material begin to deform?" If this temperature is below 140 degrees Celsius (280 degrees Fahrenheit), you have what is typically referred to as a heat-sensitive part, which can be made from wood, plastic, composite, carbon fiber, or an assembled

component with seals and/or liquid fluids. When you cure UV powder it is first melted in an IR oven, but the part does not heat like it would in a convection oven because it does not require extended dwell time to get the part up to temperature. The IR heats up the powder itself to melt it and then the part passes through a UV light to cure it. Because of this, you should not reach the heat threshold that would cause part deformation. As such, you should proceed with the test trials to make sure it will meet your other performance requirements.

The first trial involves testing adhesion to determine if the applied UV-cured powder passes either an X scribe or crosshatch adhesion test. If it does not, then test and evaluate various pretreatments and/or conductive primers. Once the adhesion test is passed, proceed to evaluating other physical properties as well as the finish appearance to determine if the UV powder meets the customer's requirements.

## The Yachting Life

***Our company powder coats stainless steel rods used on yachts. After powder coating, we cover the parts with black foam over the ends and high-contact points (such as stanchions and sharp bends), and then with a type of shrink wrap. When our customer receives the parts, some are stored inside their building and some outside. We've noticed an issue with the powder coating taking on the texture of the foam or plastic wrap on parts stored outside. We are using a TGIC powder coat material. Since this customer is storing the parts outside and is located along the southeast coast of the United States, I can't help but think something could be getting introduced without their knowing that could be causing some type of reaction. Can you help point me in what might be causing this to happen?***

Given that these parts are stored outdoors along the southeast U.S. coast, it is conceivable that environmental factors or materials used in the packaging might be contributing to this issue. Plastic wrap, when exposed to heat and humidity, will often leach out plasticizers onto the metal substrate and in this case, onto the powder coating. It would be recommended to consider a different type of covering or a paper wrap layer before the plastic wrap.

## Compatibility Quiz

***Recently, we started coating parts from a new customer using new powder and have been having some issues and rejects. Prior to this, we had good quality parts. Can you point me to anything to help me understand what is happening? Any help would be greatly appreciated.***

Since this problem began when you started to powder coat with a new type of powder, it would suggest you may have a compatibility problem. The issue of compatibility can arise when working with powder coatings of different colors or chemical compositions. Such issues may include changes in gloss, surface appearance, physical properties, or color contamination. To avoid discovering these problems on the coating line or at other inconvenient times, it is advisable to test the compatibility of the coatings by mixing and spraying them on test panels. A simple method for assessing powder coating compatibility is detailed in *Powder Coating: The Complete Finishers Handbook,* PCI Recommended Procedure #2.

It's important to note that a small amount of foreign powder can be more problematic than a larger quantity. The ratios provided in the recommended procedure help simulate conditions in a coating facility when switching between different coating colors and/or technologies. The results of the test may reveal issues such as cratering, outgassing, micro-popping, changes in gloss, color contamination, alterations in physical properties, or haziness.

A thorough cleaning of the application equipment between uses or using separate dedicated powder equipment for this new powder is recommended.

## Survey Says

***I am updating a risk survey for a powder coating operation which had previously received a recommendation for increasing the water density discharge of the sprinkler system in a small area (324 ft²) of shelf storage to 7 feet high of 50-pound boxes of powder, citing NFPA diamond ratings.***

***I am having difficulty finding the justification in the codes to require this sprinkler upgrade. I've been through NFPA 13 and NFPA 654, looking for storage guidance, but have come up short. I found a reference in the Fire Protection Handbook that powders are not customarily classified as hazardous and are commonly stored under ordinary combustible materials.***

***Just wondering if you have had this topic come up before and have some relevant info at your fingertips.***

Powders are generally categorized as ordinary Group 1 hazard materials. However, NFPA 33 does not specify this classification, leaving it to the interpretation of the local Authority Having Jurisdiction (AHJ). NFPA 13 provides a commodity classification chart, but similarly, it allows for local AHJs to determine how powder coatings should be classified.

Most powder producers in the U.S. recommend storing powders according to local regulations, with many agreeing that powder should be stored under the standards for ordinary combustible materials.

In summary, there is no definitive answer beyond adhering to the recommendations or requirements set by your local AHJ.

*Have a question for our powder coating experts? Send it to asktheexperts@powdercoating.org.*