

Ask the Experts

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Your questions answered by  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!

Down to Earth

We have been powder coating for a little bit over one year and are seeing some quality issues such as light spray or bare spots. It does not happen all the time. We will have a batch of very good quality parts and then we start to see problems. After trying to isolate the problem, someone suggested that we are not maintaining a good earth ground. Is there a guide to improving the ground of our powder coating system?

Maintaining good ground is one of the bedrock principles in a powder coating system. In all of the PCI workshops and training events, grounding is emphasized several times. Some of our speakers have joked that if we played a drinking game based on how many times “grounding” is mentioned, no one would be able to get out of their seats. To produce good, consistent quality film builds, there has to be a good conductive ground. Powder material by itself is an insulator, so as the powder builds up on the hooks and hangers, it degrades the grounding capability of the system.

The best way to check for good grounding is to measure the conductivity using a megohmmeter, otherwise known as a “megger.” It's best to test by placing a part on your hanger and checking the conductivity to the earth ground of your booth. According to the National Fire Protection Association (NFPA) 33 standard, the conductivity must be less than one meg-ohm. If it is over this amount, you have bad ground. It is best to start testing with clean hooks and measure the ground. After each cycle through the system, hang a clean part and check the

ground again. It might be one cycle or more before you record bad ground. This gives you a known point in time when either the hanger needs to be cleaned or a new hook should be used.

Visit the PCI website at www.powdercoating.org/store and use the search box for the term grounding. Watch the webinar titled “Optimizing Powder Coating: The Importance of Grounding” which explains this in greater detail.

Dukes of Hazard

I am a commercial property manager in Connecticut. I have a tenant desiring to move his powder coating business to one of my industrial buildings. The building is concrete, block, and steel construction. It does not have any sprinkler fire protection. My owner is concerned about potential fire hazards and was wondering if a powder exists that achieves an OSHA fire protection rating of zero (0)? Can you recommend a company that makes this?

There are no powder coatings that have a fire protection rating of zero. However, the majority of powders are a rating of one (1), which means that the powder must be preheated to burn. If you have a pile of powder on the floor and you apply a flame to it (i.e., propane burner) the powder will burn. However, as soon as the flame is removed it self-extinguishes. In comparison to other products such as liquid paint, solvent, or oil-based products, this is a very low-risk factor. If you wish to read more on the rating system, please check out the National Fire Protection standard; NFPA 704, *Standard System for the Identification of the Hazards of Material for Emergency Response*.

While the risk is low, you still would be required to install a fire protection system in the powder booth unless it is a single powder booth with only one manual powder gun and less than nine square feet in size. Details can be found in Chapter 15 of the NFPA 33 standard.

What Wood You Do

We currently coat seven-ply full maple plywood products by first using a liquid seal polyurethane coating. Afterwards, we sand it and apply an ultraviolet (UV) based digital printing. Would it be possible to use a clear powder coating over this?

Based on what you have explained, yes you would be able to apply a clear powder coat over the printing. The type of clear coat selected will determine the curing process. If it is a thermal cure powder, it can be cured via an infrared cure oven. If it is a UV product, you would use an infrared oven to

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flow the powder and then cure it with a UV lamp similar to the digital printing application. Another area you may want to consider would be to coat the plywood with a base coat of powder rather than liquid polyurethane. You could eliminate your sanding operation and print directly on the base coat after it is cured.

Electric Guide

We are an OEM and want to do some electrical work in our powder paint area, but the technicians require the building and equipment electrical class, division, and group info. Supposedly this comes from a plant design engineer which of course we don't have. So, I'm looking ultimately for some help in this matter. Can you point me in a direction?

The National Fire Protection Association (NFPA) 33 is the standard that most authorities having jurisdiction utilize for this information. Specifically, Chapter 15 covers powder painting operations. In general, anything inside the powder booths or within a three-foot radius of any opening or door in the booth is in the zone that is classified as Class I, Division II. That means that any equipment used in the booth or any switch or device that is wired that is in this area must meet that explosion-proof standard.

Closing the Gap

We would like to know the minimum gap between two metal items to achieve the proper powder coating. We have 1½-inch bars that will be applied over an 11-gauge panel. The design shows the bar tight to the panel. If we do that, we won't have a coating between the panel and bar which we believe will result in rust in between them (outside gate application). Thus, the reason for the gap. Will we get a proper coating with a ⅛-inch gap, for example?

Depending on the application, there are two answers. The goal is to have coverage (pretreatment and powder) on both the back side of the square stock and the face of the 11-gauge sheet.

1. Manual reinforced, meaning the operator coating up and down on each side of the square stock but can push the powder into the zone.
 - For full coverage on both surfaces, a ⅜-inch to ½-inch gap is recommended to achieve full coating.
 - If pretreated properly, you could achieve chemical flow with a slightly smaller gap, but ⅛-inch seems tight. It may depend on the quality of the pretreatment and coverage. Regardless there will not be full coverage beyond the interior edge with a smaller gap like this.
2. Automatic application with an expectation of the guns achieving full coverage with no touch-up.
 - Rule of thumb is 1½ – 3 times the width of the material.

- In this case, 1½-inch stock would need to be around a 2¼-inch gap for auto coverage. You might be able to squeeze this to 2 inches.

Regardless of the application above, it would be time well spent to mock one up, so you don't waste too much material. Do this with only a few tack welds or a spacer to hold the gap desired. Coat and cure the mock-up. Then quickly cut the welds and peek behind the bar stock. This will provide a better indication if it meets expectations and if there is a need to reduce or enlarge the gap to optimize.

Pig Pen's Dust Cloud

I am a maintenance worker for a powder coating operation and am having problems with a lot of powder escaping from our powder booths. It is creating a housekeeping issue trying to maintain the proper cleanliness in the powder application area. What are the minimum airflow (airspeed) requirements for a free-standing spray booth and how can I verify my airflow?

PCI recommends 80 to 120 fpm face velocity across any opening in the powder booth. If this is an open-front type of booth, you should have this velocity across the entire opening to capture the powder overspray. If you have a conveyerized line, this would include not only the entrance and exit vestibules but also the roof slot and manual operator spray openings or automatic application openings. The easiest method to measure the velocity across the openings is to use a velometer. If you map a grid of each opening and take several velocity readings of each, an average velocity can be recorded. If you are below the recommended minimum, then you should check your powder filters as they may be getting plugged and need replacement.

Invisible Ink

We've dealt with mill stencils on steel as long as we've been in business (2003). We've always removed it before pretreatment with a solvent (typically MEK). Lately, the mill markings have been reappearing during the curing stage. Has something in the steel industry changed? Are the mills using a different kind of ink? Our customers and their steel vendors are unhelpful. We've asked customers to avoid sourcing steel with mill markings, but many don't want to change processes.

It sounds like the ink is soaking down into the scale and resurfacing when it gets hot. Nothing can be done short of removing the surface with an acid. You might consider talking with your pretreatment supplier to see what they recommend.

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