

## Ask the Experts

sponsored by  
**Gema**

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!*

### Hooked on Cleaning

***Would you have any information on the different types of hook cleaning? We are looking at doing this at a new plant, are in the process of setting up, and want to understand the pros and cons of each process.***

The stripping of cured powder from hooks and racks is an inevitable task and a necessary evil to make sure you have a high transfer efficiency during powder coating application. There are several hook cleaning methods that can be used.

1. Mechanical stripping methods rely on fracture or abrasion of the cured coating using a variety of blast media such as aluminum oxide, sand, and garnet, etc. The advantage of this method is that you can strip one at a time or in batches. The disadvantages are that the hangers have a very small cross-sectional area that can be difficult to aim at and deformation of light hanger sections may occur if the blast is too aggressive.
2. Thermal stripping methods include burn-off ovens, fluidized beds, and molten salt. This method relies on the destruction or breakdown of the organic portion of the cured coating by exposing it to high temperatures of 750 to 850 degrees Fahrenheit until the coating is degraded to a carbon char. The advantage of this method is that it is relatively easy to perform and works with most coatings. The disadvantage is that the temper of spring clips and the hardness of the hanger can be diminished due to the elevated temperatures. Also,

certain metals such as magnesium cannot be used due to their ignition potential.

- a. For burn-off ovens, the char can be removed from the hooks by rinsing with water or blowing it off with compressed air.
  - b. For fluidized beds, the parts are lowered into a bed of sand or quartz which are fluidized by air and combustion gases. This quickly heats up the hangers and vaporizes the coating. The media scrubs the char from the hanger and secondary cleaning the ash from the hanger is not necessary.
  - c. In molten salt baths, the racks are dipped into a liquid bath of salt which will oxidize the coating, removing it as quickly as a few seconds to a couple of minutes depending on the type of coating and thickness. After the salt bath, the parts are rinsed to cool them and remove any salt film residue. No secondary cleaning is required. An advantage is that this process is easily incorporated into a continuous system.
3. Chemical stripping methods can be used in both heated and non-heated solutions. The chemical solution causes the saponification of the coating which causes it to dissolve, swell, or otherwise degrade so that it either strips off the components on its own or during the rinse. The disadvantage of this method is that some of the chemicals used can be hazardous, although newer developments are less so. The advantage is that this type of cleaning typically does not impact the metal of the hook and can be done as a batch or in an inline system.

### Spiraling Away

***I am quality control manager here at our plant and I am really having a hard time positioning our guns so that we get an even coat on a part which is formed into a spiral shape (the spiraling is the hard part). There are really only two bar sizes for which we have strict thickness parameters, and it might be more of a math equation than a powder coating expert problem, but I thought I would reach out anyway.***

With powder coating, the typical recommended gun tip-to-part distance is 12 inches to the face of the part. If a part has depth, or as in your case a second bar, the electrostatics should be able to do the job. The powder booth exhaust should be set to capture the powder within the booth and it is typically recommended to have 100 to 120 fpm through your booth openings, so the powder doesn't escape out of

**Make Gema a part of your shop and experience how simple it is to be so productive.**

[completeitwithgema.com](http://completeitwithgema.com)

**Gema**

**SYNCHRONIZE IT   CHANGE IT   INTEGRATE IT   AUTOMATE IT   COMPLETE IT.**

the booth. There should be enough velocity from the powder flow and atomizing air to “push” the powder across the parts and allow the electrostatic charge to do its thing. You should also check to verify your parts are grounded properly. It is required to have less than 1 meg-ohm of resistance from your part to the ground. A megohmmeter (typically called a “megger”) can be used to check this. If your parts are not grounded properly due to paint build-up or other issues, then the electrostatic charge will not work.

## Hardly Soft Water

***I have a facility located in a rural area that has very hard water which results in build-up on and in my equipment and causes quality problems with my parts. Is there any way we can fix that or is there a chemical that would work with hardness? Please help.***

Your water supply quality is always impacted by the location of your facility. It is common for areas that rely on well water to have a very high hardness level. Unfortunately, there isn't a chemical that can be added to reduce water hardness. Depending on the type of water quality you desire for your operation, you should consider adding a water softener to your incoming water. If you need higher quality, then installing a reverse osmosis (RO) or deionized (DI) water system may be required. To determine which would be best for your operations, contact a manufacturer or distributor that sells this type of equipment, and provide them with a water sample or an analysis of the current water supply. Typically, less than 1,000 microsiemens water quality is required for the cleaner stages, less than 750 microsiemens for city water rinses, and below 150 microsiemens for final rinses. They will be able to provide a recommendation on the equipment needed.

## Just Like Riding a Bike

***I'm in charge of the production at a bike factory and I'm contacting you because I'm looking for a powder coating solution for steel frames. We want to develop our internal powder coating line and we are looking for information and technical data about the possibilities of the powder coating: color, type, texture... and the process to use a powder coating.***

Powder coating on bike frames is currently being done throughout the world. Powder coating is very durable and comes in many colors. The following considerations can help you get started:

- Think about coating performance requirements such as weathering and impact resistance. Also consider the market level you will be selling your product (low-cost, expensive touring bike, or somewhere in between)?
- Find a powder producer that serves your area. They can help determine which type of powder coating will meet

your needs. They can also provide their standard colors, which are less expensive than custom colors.

- As for the process needed for powder coating steel frames, you would need to consider the following:
  - Either sandblast the frames or clean them with a chemical pretreatment process such as cleaning with an alkaline cleaner and applying a conversion coating like zirconium.
  - If you use a pretreatment system, you will need to dry the parts in an oven prior to coating them.
  - Apply the powder in a powder booth. You will have to determine if you will powder coat by a manual operation or by automatic powder guns. Typically, this is determined by your throughput and labor availability. You also will have to determine how many colors you will be using. There are powder booths that are made for color changes or spray to waste. The volume of each color typically will determine which is most cost-effective.
  - After the powder is applied, the frames will need to be cured in an oven. The time and temperature will be determined by which powder you use and the thickness of the bike frame material.

Use the PCI website as a resource to locate vendors who offer the products and services you'll need: [www.powdercoating.org/directory](http://www.powdercoating.org/directory).

## Controlling the Weather

***The powder booth at our facility is an open front design which is only closed off with a plastic curtain. The humidity level is hard to balance because the booth is near the machine shop area. Is there anything we can do to reduce the humidity levels? Is there any other suggestion you can make as to how we can better control the humidity level?***

Unfortunately, there is no easy fix. Mother Nature likes equilibrium in both temperature and moisture in the air. Any open area will try and balance itself out unless you incorporate some type of interference like having an environmental room to keep the spaces separate. Since the booth pulls air from the surrounding area, it will pull in the humidity from the shop. The best thing for you to do is to have an environmental room built around your powder booth, if feasible. This room can then be controlled for both temperature and humidity. It is recommended for powder application to control to 75 degrees Fahrenheit,  $\pm 5$  degrees, and 50% relative humidity,  $\pm 10\%$ . This room would be the proper place to store your powder prior to usage.

*Have a question for our powder coating experts? Send it to [asktheexperts@powdercoating.org](mailto:asktheexperts@powdercoating.org).*