



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!

In a Jam

I have a powder coating line and am experiencing problems with the grounding of my parts. Specifically, the problem is with the load bars on my conveyors. Is there a particular hook material or finish that is required for a good ground? We are currently considering removing our load bars to have them sand blasted. Is this a good solution? Looking for advice to get us out of our jam.

First, you are addressing one of the most important components for achieving a quality finish on your products in checking your ground. For both meeting the safety standards and obtaining the best transfer efficiency, all parts should be grounded and verified with a Megohmmeter. You should have less than 1 meg-ohm of resistance. It is best to start at the lowest part on your hanger and check each part, moving up the rack or hooks. You might be good near the top, but all it takes is one hanger or part to be covered with cured powder to prevent a proper ground. Normally, standard mild steel without any coating on it is used for load bars to provide the best electroconductivity for your ground.

In your case, it appears that you have identified the issue as being with your load bars. To achieve a better ground, you are on the right track having the load bars blasted or chemically stripped. However, you should consider further investigation into "why" this is happening. It might be that your parts being coated are too close to the load bar and causing the load bars to be coated during the powder coating process. If this is the case, look into using longer hangers to get them further away

from the powder cloud. You might also double check the air flow in your booth including cross draft and through the roof slot. The booth might be out of balance or need more air flow (typically 100 to 120 fpm) through your openings.

On the Same Page

My company fabricates a product that we send out to several custom coaters to be coated. However, we have experienced some inconsistencies in the final quality. Are there any standards to define the powder coating characteristics and performance that we wish to achieve that can be given to the custom coater?

Yes, although this can be a touchy situation if the specifications are not clear for everyone in the supply chain. Powder coating characteristics generally fall into three categories:

- Surface appearance such as color & gloss.
- Physical properties such as texture or smoothness.
- Environmental durability such as outdoor UV requirements or salt spray corrosion resistance requirements.

These characteristics should be defined by you to meet the desired requirements. These can be given to the custom coater and their suppliers. With a clear definition, it should stop any finger pointing as all would understand what specification/characteristic is required. The following are some tests that can be used to set the characteristics:

- Gloss: using a Glossmeter as in ASTM D523.
- Color: using a Colorimeter as in ASTM D2244.
- Smoothness: PCI Smoothness Standards as defined in PCI Technical Brief #20.
- Distinctness of Image: either visual observation or meter as in ASTM D5767.
- Contrast Ratio: for special substrates or reflectance instruments as in ASTM D2805 or PCI Technical Brief #3.

Other physical characteristics that may be considered are film thickness, impact resistance, flexibility, adhesion, hardness, abrasion resistance, edge coverage, chip resistance, and post machining (drilling and tapping).

Some environmental characteristics to consider are solvent resistance, stain and chemical resistance, humidity resistance, salt spray resistance as per ASTM B523, weathering UV resistance as per ASTM D822, and temperature resistance.

One method would be to take a sample product that meets your requirements and send it to a lab to have the

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characteristics measured and documented which can then be used to set your standards. Another way would be to work with a powder producer to discuss and set these standards. One thing to remember, the tighter the standard and more characteristics that are required can increase the cost of the material and manufacturing of the product. You should keep the specification to what is needed for your product.

The Flame

I am new to powder coating and serve as our company's health and safety manager. I was trying to find information on the flammability and combustibility of powder coating in addition to what is on the material safety data sheets (MSDS). Would you be able to point me to where I can find such information?

As each powder coating is a unique formulation and has its individual characteristics, the MSDS would be the best place to find this information for any particular powder. However, if you are looking for some general information on powder coating flammability and combustibility you can refer to the National Fire Protection Association's NFPA® 33 Standard for Spray Application Using Flammable or Combustible Materials. Specifically, the following chapters:

- Chapter 15—Powder Coating.
- Annex A—Explanatory Material.
- Annex C—Determining Ventilation Airflow for Powder Application Systems.
- Annex D—Fire Record.

Your best bet would be to start in the Annex C section which covers determining ventilation airflow for powder application systems. It has great explanations as well as calculations and representative test data for various types of powder.

Real World Results

We have been manufacturing our product for many years and I am looking to improve our coating performance. Our product is used outdoors, and our mission is to provide top quality performance for our customers. We need to know if there are any guidelines to correlate impact test results with real world performance. For example: XX foot-pounds would equate to a ¼ inch hail or YY foot-pounds is considered "tough," etc.? Can you help me understand the correlation or point me to some testing that has been completed?

There is not a true correlation between impact testing and hail. However, standard durable polyesters can easily achieve 160/160 inch-pounds (direct/indirect on a Gardner impact tester) of impact performance but have limited weathering performance. Superdurable polyesters can achieve 120/120 inch-pounds of impact performance and have significantly improved weathering performance. Not all superdurables

will have this; most superdurable polyesters have significantly reduced impact performance. You need to check the technical data sheet (TDS) to determine if a particular superdurable has what you are looking for or contact a powder coating manufacturer for advice.

Clean Enough

We manufacture parts that are primarily cast iron and machined for use in the automotive, agricultural, and construction equipment (ACE) industries. We are not sure if we are cleaning our parts properly prior to powder coating them. What steps should we take to ensure that we are getting a quality finish that will meet the performance expectations?

As always, it is suggested that you start with the end performance expectations. Since your parts are used in the automotive and ACE industries, performance requirements will most likely include high corrosion resistance. To achieve this, the cleaning and pretreatment process plays a crucial role. First, you must review the types of machining lubrication used during the fabrication process and determine its ingredients. For example, is the lubrication an oil-based product or does it include other items such as surfactants, waxes, or other ingredients? Give this information to your pretreatment chemical supplier so they can determine the best chemistry for your cleaning stage(s). Also, depending on a few variables, they can determine whether the parts should be processed in a spray application or an immersion tank. Remember, if you do not remove the oils and other contaminants, they will be captured below the conversion coating and powder layers, leading to a premature failure.

The next step will be to determine which type of conversion coating will meet the corrosion resistance requirements. Again, your chemical supplier can explore whether an iron phosphate, advanced pretreatment chemistry such as zirconium, or a zinc phosphate chemistry would be best suited for your product.

To determine which scenario would work for either the cleaning or conversion coating, send some test parts to the chemical supplier's lab so they can run trials. By changing the variables, you will be able to see which method and chemistries best meet your performance requirements.

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