Not Just White. VERY White

Q **Dear Joe,**

My problem is that a customer wants a white powder paint (very white), and all those that I have applied are too yellowish. Is there a solution?

Thanking you in advance,

Aissa K.
Montreal, QC

A Dear Aissa,

Thanks for the question; this is a common problem. Your customer requests a very white powder. While "very white" is a relative term, I think I can still provide some guidelines to allow you to provide the whitest finish for your situation.

First of all, the chemistry of the powder coating affects whiteness. For example, hybrid and especially epoxy type powders have a tendency to yellow upon baking. Powder types less prone to yellowing include polyesters, polyurethanes, and acrylics. Formulating technique also affects the yellowing of these chemistries. The choice of pigment, crosslinker, and additives can significantly influence yellowing resistance. So be sure to evaluate more than one version of these types of powders.

Overbaking (high temperature and/or extended time) exacerbates this problem. Furthermore, the quality of your oven affects whiteness. Gas ovens cause more yellowing than electric or infrared types. Incorrectly adjusted gas/air mixtures will cause more yellowing as well, so it is imperative to keep your oven burner adjusted properly and to avoid overbake conditions. In addition, make sure your oven is properly vented, as accumulation of combustion by-products can cause yellowing.

If your customer requires an extremely highly reflective white powder for an application that involves lighting fixtures, then a specifically formulated powder is required. These products will incorporate special grades of titanium dioxide (white pigment) and quite possibly an optical brightener and antioxidant.

I hope that this helps solve your problem.

Warm regards,

– Joe Powder

Matchmaking

Q **Hi Joe,**

We currently are being asked to match a powder so we can powder coat steel parts that need to match an anodized aluminum hinge. So far, we have not had much success. Do you feel I'm spinning my wheels trying to match a powder to a plating finish? I'm thinking it's kind of like the chrome powders that are offered, they call it chrome powder, but it really doesn't look anything like chrome plating. Would I be better off asking them to powder coat the steel parts and the hinge if they want everything to match?

Thanks in advance for your help.

Jim A.
Oklahoma City, OK

A Hi Jim,

Powders can be formulated to approximate the appearance of anodized silver. It won't be an exact match but will come pretty close. This will be a low gloss metallic effect, and recently powder companies have offered them as a specialty product line. Depending upon the eventual environment that the coating will be exposed to, you may have to apply a low gloss clearcoat for extra durability because the metallic pigments used to create the effect can oxidize in outdoor conditions. The clearcoat will seal the surface and provide significantly improved durability. If this is for an interior application that won't see much wear and tear, then the clearcoat won't be necessary.

Best regards,

– Joe Powder

I'd Like a Bamboo Sandwich, Please

Q **Hey Joe,**

We build high performance composite skateboards (bamboo sandwiched between fiberglass/epoxy) and we're looking for 2 things:

1. **A non-toxic or low toxicity sealer for the edges and bottom surface of the board.**
2. **A non-toxic or low toxicity finish to act as a grip surface on the top of the board.**

It needs to be flexible, durable, and clear or amber. We currently use a water-based urethane dispersion for both, with a silica aggregate for the grit surface. Any help or thoughts would be appreciated.

Don T.
Culver City, CA

A Hey Don,

Powder coatings, which are non-toxic by their nature, can be applied to composites. A number of issues need to be considered with this process. The composite board probably does not have sufficient conductivity to electrostatically spray powder onto its surface. Therefore, a conductive preparation will have to be applied to the board prior to powder coating. I can provide you with a few options if you wish.

The next issue is identifying a powder coating that can be applied and cured at temperatures low enough to avoid distorting the board or causing volatiles to evolve from the composite. Some low-temperature powders can be cured around 250 degrees Fahrenheit for around 20 to 30 minutes. If your composite remains intact under this condition, then I would pursue this option.

If 250 degrees Fahrenheit is too high, then you can consider using UV-curable powder coatings. This technology allows you to process powder coatings in the range of 200 to 250 degrees Fahrenheit. Using these products will require a low temperature melt phase followed by exposing the warm powder surface to intense UV energy. The UV is generated by specially designed lamps that are commercially available. The advantage of the UV process is much lower operating temperatures and a much shorter curing cycle. The melt phase typically takes one to five minutes and the UV step requires a couple seconds. Both the low-temperature cure powder and UV-cure material can be formulated in clear or amber appearance. A grip surface can also be formulated using silica or other inert material.

Good luck,

– Joe Powder

A Screwy Situation

Q **Dear Joe,**

I want to color the heads of stainless steel 18-8 screws, as well as nuts, white and have them last in an exterior environment. Can you recommend a process, and a resin or stain?

Thanks,

Ron J.
Sparta, WI

A Dear Ron,

You can powder coat these; however, I would offer these guidelines:

- Be careful not to coat the threads. You will need some kind of masking scheme or alternately you can blow excess powder off with a gentle puff of compressed air.
- Roughen up the surfaces to be coated. This will provide the best adhesion. Media blasting is best, but a wire brushing process will work.
- Ensure that surfaces are absolutely clean before applying the powder. Solvent washing is a good technique. I recommend using acetone to remove any oil or dirt.
- Use a polyester TGIC powder for exterior durability. Apply about 1.8 to 2.2 mils of coating. More than that can result in sags. Too little and you may have incomplete coverage.
- Make sure the powder is completely cured. Follow the curing guidelines of the powder supplier's product data sheet.

I hope this helps. Good luck with your project.

– Joe Powder

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Editor's Note: Letters to and responses from Joe Powder have been edited for space and style.

Not Your Average Joe...

Each issue, we take the padlock off the PCI® Test-Lab door for a few minutes so our favorite technical editor and "powder guru" Joe Powder can run in the yard. When he's not gnawing on a rawhide bone, he loves to answer readers' questions. Go ahead and send him one at askjoepowder@yahoo.com... he doesn't bite. Maybe it'll end up in the next issue!