# 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!***

## Striking Oil

***I'm an engineer who needs some support with my powder coating equipment. We had an incident with our air compressor and there was oil contamination in the line. What is the procedure for decontamination? I disassembled the equipment and found some oil in the air hose. What can I do?***

First, confirm that your compressor is operating correctly and that all upstream compressed air filters and dryers have been cleaned as per the manufacturers' recommendations, or replaced. The air piping from the compressor to the powder booth(s) may also need to be cleaned. Adding an oil removal filter just prior to the powder booth will add an additional step to capture any oil that is in the line. Once the air supply is stabilized, you can address the powder equipment as follows:

1. *Isolate the equipment.* Disconnect all outbound air lines from the control unit to prevent further contamination.
2. *Introduce clean air.* Connect a verified clean compressed air source directly to the control unit's main air inlet.
3. *Deactivate charging.* Set the voltage control to zero (0 kV). This disables electrostatic charging but still allows airflow through the system.
4. *Activate the gun.* For manual equipment, pull and hold the trigger (or temporarily secure it). For automatic equipment, activate the gun through the system controls.
5. *Purge the system.* Allow clean air to flow through the unit for an extended period. Periodically check the outlet by holding a clean white rag or paper towel over it to see if oil residue is still present.
6. *Evaluate results.* Depending on the severity of contamination, purging may not be sufficient. Tubing, seals, or other pneumatic components inside the control unit may require replacement.

Finally, consult the technical manual for your equipment and review the manufacturer's air quality requirements. Typical compressed air parameters for powder coating equipment include:

- Input pressure: ~5.5 bar / 80 psi
- Maximum water vapor content: ~1.3 g/m³
- Maximum oil vapor content: ~0.1 mg/m³

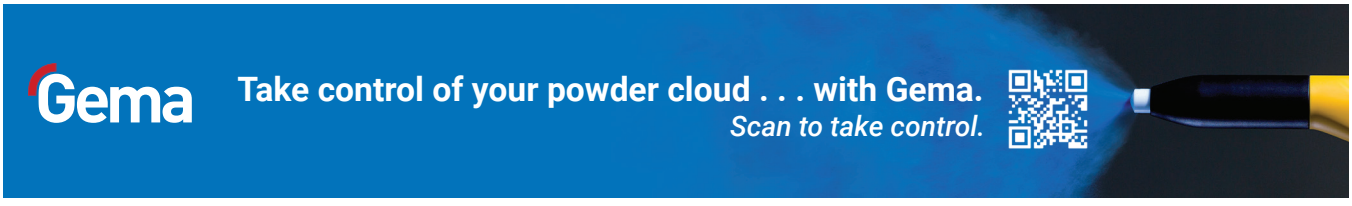
While oil contamination can be disruptive, careful cleaning, monitoring, and adherence to compressed air standards will help restore proper operation.

## Water Your Thoughts?

***We manufacture cabinets and other furniture used in the pharmaceutical and medical industries. We recently started seeing significant delamination not long after delivering products to our customers. We have taken troubleshooting measures based on feedback from our suppliers, including completely draining our 3-stage pretreatment system and checking and rechecking titrations, but we are still experiencing the issue. We have attached a field report showing testing results if that helps.***

Often, when you see excessive and almost immediate delamination issues with powder coated products, the root cause can be found somewhere in the pretreatment process. First, you should check your supply chain and make sure there aren't unexpected contaminants on your substrates that your pretreatment process isn't accounting for. Next, check your tanks and titrations with your chemical supplier, which it appears you have done.

Looking at your report, you are using untreated city water for the pretreatment process. The report shows total dissolved solids (TDS) were measured at 1,170 parts per million (ppm). TDS is the concentration of dissolved salts/minerals in water, reported as ppm, and this number should typically be less than 500-600 ppm. It also shows chloride levels are at 98 ppm, which should typically be under 50 ppm. These higher TDS can deposit on the clean metal and prevent the powder from bonding correctly and thus delaminate later. To address these variables, you should consider installing a reverse osmosis (RO) or a deionized (DI) water system.



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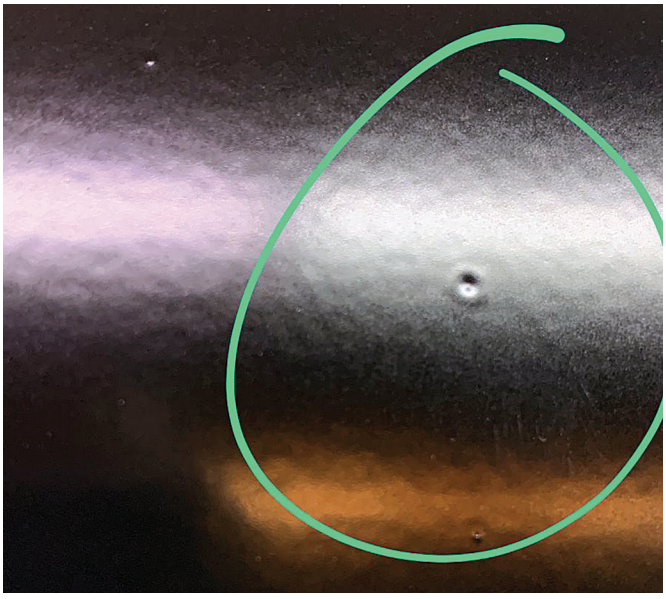
RO forces water through a semi-permeable membrane to physically reject dissolved salts, organics, and many microbes. The process can remove up to approximately 90-99% of dissolved solids and also reduces particulates and some organics. DI uses ion-exchange resins that produce water that is very low in ionic content; it does not remove non-ionic organics, bacteria, or particulates unless combined with other filters. These processes are often used together: RO as the bulk-removal step (removing most salts and solids) and DI as a polishing step to reach very low conductivity/ultrapure water.

Besides bringing your TDS and chloride levels in line, using RO/DI water may also reduce the chemical concentration needed to achieve the same efficacy of cleaning and pretreating. Of course, you should collaborate with your chemical supplier further to evaluate your specific needs.

## Craters Belong on the Moon

***We are seeing craters appear intermittently on cold rolled and stainless steel parts that we powder coat. We have a 4-stage iron phosphate pretreatment process with in-line spray washers, a detergent additive, and deionized rinse water. We have sprayed pretreated test panels with powder from a different supplier and those also have craters. Several corrective actions have already been attempted, including washer maintenance, removal of unapproved lubricants, elimination of silicone sources in tunnels, and checking air quality controls. Despite these efforts, the craters continue to occur.***



You have already taken many steps that we would have recommended. What you are describing suggests that the issue points to some type of contamination, such as residue from the pretreatment process that hasn't been brought under control, or even volatiles getting trapped under the coating during the curing process if your oven exhaust isn't adequate. Be sure to check your compressed air supply for oil residue, improve oven exhaust cycles, and ensure no silicone remains in your line.

If you have an offline batch booth, you should try coating test panels there and compare them to panels you run through the production line. If you see few or no craters with this testing, then you will need to focus on the probability there are contaminants continuing to find their way into the process.

## To the Heart of the Matter

***Request for some advice from a metal manufacturing and powder coating company in Wales, UK. Are you able to provide safety information on the use of powder coating equipment for someone who has a pacemaker fitted, plus further technical data such as fields, voltages, and frequency?***

***One of our operators has just had a pacemaker implanted and his clinician is requesting more information before he provides medical advice.***

Your question is a good one, and one that has been asked by others over the years. We are by no means doctors or pacemaker experts, so we must defer to technical documentation as a starting point. Within the operational manual for your powder equipment, you should find information regarding pacemakers. The manual we reviewed stated the following, "As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations." Areas of installation typically refer to the inside of the powder booths as well as the immediate area surrounding the booth.

We also looked online for general sources of information. One place we found was the Pacemaker Club. This may be a public resource that is helpful for your operator as they navigate other restrictions related to their pacemaker.

As requested, here are some general specifications on the electrostatic power from a powder coating gun (which will vary from manufacturer to manufacturer).

- Maximum current level of approximately 110 microamperes.
- Average frequency of approximately 18kHz.
- Polarity is negative.

Overall, we recommend that the operator consult with the manufacturer of the pacemaker, have them collaborate with the manufacturer of the powder equipment you use, and speak with his/her doctor before being exposed to the powder equipment.

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



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