

POWDER COATING MAGAZINE

Powder Coating's Weekly Q&A
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Eliminating Crevice Corrosion

Q. We use a seven-stage zinc phosphate pretreatment system. The last two tanks are used for rinsing. The design of our product creates a condition called crevice corrosion. Two sheet metal subassemblies are skip-welded together. The majority of our parts are coated white. Over time, moisture from outside allows rust to form in the crevices. The units that are coated other dark colors do not have this problem. Is there some type of sealer that we could add to the extra rinse tank to seal the crevices and prevent the rust? I have contacted our chemical salesperson, but I have not received an answer.

D.H., Danville, Ky.

A. Thanks for the question. Even though you state you only have bleed-out and postrusting problems with the white, my guess is that you have it with all colors. Problems associated with spot welding (lapped edges) include:

- Alkaline/moisture bleed-out
- Oil bleed-out
- Premature corrosion

Alkaline bleed-out occurs when you allow the strong alkaline cleaners (hydroxide containing) to penetrate between lapped edges, but insufficient rinsing does not neutralize the entrapped alkalinity. The hydroxides re-solubilize after time or exposure to wet conditions and in effect alkaline strip or disbond the coating. In some cases, retained moisture forms insufficient heat or air scrubbing in the dry off creates problems.

Oil bleed-out occurs when the space between the lapped edges is not great enough to allow cleaners and conversion coating to get in and remove the soil during pretreatment. The cure oven is your best quality inspection device as it re-fluidizes the organics during melt and flow of the powder, and the soil interrupts this process, creating rejects or voids in the coating.

Premature corrosion from lapped edges is the outcome of not cleaning, rinsing, conversion coating, and powder coating bare metal. Moisture,

through capillary action will penetrate these areas in the field and corrosion begins, spreads, and ultimately leaves rusty stains permeating from the exposed area.

What should you do? You have a couple of options. One is to allow enough space between the edges for pretreatment and coating to penetrate. Another is to post-fabricate or assemble after coating. Sometimes, precleaning the steel before spot welding eliminates oil bleed-out, but you still have potential for premature corrosion if the coating can not wet or penetrate. Electrocoating, priming, and powder topcoating are generally a sure bet if again there is enough space between the lapped edges to allow coating penetration. Finally, a continuous weld will prevent this from occurring. This is not a pretreatment or seal-rinse problem. This is a manufacturing issue, a design issue, or both. Most coaters solve this through trial and error. It is usually difficult to address and solve, but it can be done. I hope this helps you understand the issues involved and gets you on track to resolve the problem.



Powder Coating Website - More great information

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