Rust Season

We applied RP & sealed our packaging – why did our parts rust?

In the Lab when we want to intentionally make Rust Preventative (RP) treated parts rust more quickly than they would under normal storage conditions we raise the temperature and we also raise the humidity to perform accelerated corrosion testing. We do this in a humidity chamber which carefully balances temperature and humidity just below the point at which it would start condensing (forming water droplets) on the parts and other surfaces. IF something goes awry in that delicate balance then droplets of water form on the parts and also upon the walls and ceiling. When the droplets above the parts get large enough that surface tension no longer holds them then they drop like rain on the parts. The droplets that form on the parts or drop on the parts dilute the generally water soluble Rust Preventatives (RP) on the parts and start washing the RP away - pretty soon they rust prematurely because they are no longer protected. So why am I babbling on about a humidity chamber when you want to know how to keep parts from rusting during "rust season?" Because a great many incidents of both red rust (iron oxide) and white rust (aluminum oxide) are caused when people accidentally create "humidity chamber" conditions in the shipping containers their parts are in. Let's look at a common example of how that happens.

Cast parts (iron or aluminum) are packed straight out of the washer. They come out "looking dry" but they are considerably warmer than ambient temperature – meaning warmer than the temperature of the surrounding environment. As soon as dunnage (packaging) is full it is sealed up in a plastic bag to keep the parts clean until point of assembly. When the plastic bag gets sealed up around the warm parts it creates a micro-climate within the bag which is warmer than the ambient air outside the bag. Often within moments of sealing up the bag you can see the bag start fogging up inside – but remember that workers may not notice simply because they have moved on and are very busy packing the next set of dunnage/packaging. The warmer & more humid micro-climate in the bag (or closed up package) is essentially an "accelerated corrosion chamber" or "humidity chamber" – and either white or red rust is favored in that environment – meaning it will happen more rapidly than under normal storage conditions.

So how do you avoid that?

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One key to avoiding “humidity chamber” conditions in your dunnage/packaging is giving your warm/hot parts time to cool down to within 5 degrees Fahrenheit of ambient temperature before sealing them up tight in dunnage/packaging. While less common, if your parts are cooler than ambient temperature at point of pack – you want them to warm up to within 5 degrees Fahrenheit of ambient temperature before sealing up the packaging.

Another key to avoiding “humidity chamber” conditions in your dunnage/packaging is ensuring both parts and dunnage/packaging are totally dry – little spots that are close to dry but not quite dry provide the seed moisture which boosts up the humidity. Giving them time to get fully dry before greatly restricting their opportunity to dry is very helpful. Packing them when even just barely wet is a recipe for early corrosion.

A third key is worker observation and an effective reaction plan. It is helpful to train your workers to observe and appropriately react to signals like fogging up of bags soon after sealing them shut. While the natural inclination of most workers once those bags are sealed is to move on assuming they are done with them – it is worth a quick inspection a few moments after the bag is sealed to see if even slight fogging is noted on the inside of the bag – which would indicate “trouble is brewing – effective human intervention is needed.” Actions taken right away - to open up the bags and take other immediately needful steps to fully dry the parts and/or packaging before again sealing it up tight - can go a long ways toward keeping your dunnage/packaging from inadvertently becoming an “accelerated corrosion chamber” or “humidity chamber.”

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If you are wishing you had read this days or weeks earlier
Pick up your phone and call Bill Ong (517) 905-5313
Ask about Production Rust Removal or Equipment