"Best Practices" — Parts Cleaning Prior to Coating

by:

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All good companies have standard operating procedures designed to have everyone working in the same manner and therefore yielding a consistent result. Without these procedures and processes, a company would find it hard to be effective and efficient. Of course, these processes are only as good as the procedure requires them to be! We have found that to be really successful, you need robust "Best Practices" to yield the highest quality and to be the benchmark in the industry. Our product quality and results are dependent on several items that we don't really have control over. We are applying our coatings on customer's products, therefore, we must have "Best Practices" in place to accommodate the variations of the surface condition of the incoming parts. Different steels, manufacture methods, manufacturing lubricates, heat treatment, cleanliness, size, etc., all play a role in how we process, and especially clean parts prior to coating.

This article will offer a "Best Practice" for the cleaning and preparing of fasteners for coating. Without a robust cleaning process, the coating process will not yield a high-quality result!

Importance of Incoming Inspection

A detailed and thorough incoming inspection is critical to a successful cleaning process, and ultimately a proper adhesion of the desired coating. Specifically, parts need to be observed for cleanliness, the presence of foreign material and the condition in which they arrived. The cleanliness of parts and the presence of foreign material directly affect the cleaning parameters with which the parts will be processed.

If during the incoming inspection, it is discovered that parts have an unusual incoming condition (i.e., excess foreign material, alternative coating already applied, etc.), then a revised cleaning process must be developed to ensure a proper adhesion during the coating process. A management team (or person/team designated) should contact the customer to make a determination on next steps based on the conditions. Once the parts/bins have had this initial visual inspection and deemed to be okay, they need to be moved to a safe and secure area to prevent any contamination from occurring.

The Cleaning Technology

There are several cleaning methods that are used in the metal finishing industry. As you can imagine, they all don't yield the same result. An alkaline wash can make a part appear to be clean, but this appearance of cleanliness can be a false assurance. It is also very subjective.

The objective of the cleaning process is not just to have a visually clean looking part, as this can be a fatal error and lead to metal finishing problems. When preparing the surface of the part for metal finishing, you need to go beyond the part's visual appearance.

Once parts arrive at their designated cleaning line, there are additional procedures that need to be conducted by the machine operator. The parts are inspected again to ensure that the parts are ready for processing, production logs are updated and the parts' unique work order is entered into the processing line's computer system.

And the parts are not only inspected before entering the processing line, but they are also inspected while entering the process line. Machine operators are able to watch parts as they enter the system through the use of a camera that transmits a live-feed video to a monitor located at the operator's work station. This additional inspection helps to prevent any foreign material located at the bottom of the customer bins such as paperwork, tub tags, cardboard, etc., from being processed along with the parts.

Production logs are kept for precise tracking of which parts were processed at what machinery and at what exact time. These detailed records enable an applicator to maintain accurate records as well as to monitor line throughput.

When a part is first processed, it is given a specific cleaning recipe to set the processing parameters. This cleaning recipe is determined by a history of parts with similar geometry, incoming conditions and coating desired. These recipes control all variables through processing, and this ensures that the parts undergo a consistent cleaning process each and every time.

This is important because you want to make sure that your cleaning process is addressing those specific problem areas on the parts (i.e., recess heads, fine threads, intricate

geometries, etc.).

A computer-controlled cleaning process ensures parts are cleaned with a proven recipe each and every time they are processed. There is a variety of variables that must be determined when building a specific recipe for a part. And each stage of the cleaning process plays a pivotal role in ensuring a proper adhesion of coating.

During the initial washing stage of the cleaning process, the Quality Assurance (QA) Department must determine a variety of variables. The QA Department must decide what is the proper weight per basket to get an extensive cleaning result while maximizing efficiency, how long parts must be submerged in the cleaning solution, at what RPM the parts should rotate while in the solution (this provides a chemical and mechanical clean), etc.

Once the parts have completed the washing stage, they are transferred to the rinsing stage. The rinsing stage is designed to remove the cleaning solution along with any foreign material still present on the parts. Like in the washing stage, all variables of the part-specific recipe are predetermined by the QA Department.

Now that parts have completed both the washing and rinsing process stages, they must undergo a shot-blasting process. The shot-blasting stage is designated to remove any scaling from the manufacturing process. The shot-blasting process also aides in cleaning weld spots on stampings having intricate designs.

And because the shot-blast media consists of carbon and manganese material, the media helps by inducing a slight abrasion on the surface of parts. This slight abrasion allows for better adhesion during the coating process. Like all other stages, the shot-blasting stage is recipe driven and computer controlled.

In the shot-blasting stage, the QA Department determines the amount of media to ping at the parts, the distribution pattern used to ping the media, the duration of the stage, the speed of rotating baskets, etc.

Test for Cleaning Effectiveness

To validate the cleaning process, QA conducts a Copper Sulfate test on a set sample of parts. The Copper Sulfate test is a visual test that gives QA an immediate representation of the effectiveness of the cleaning process. This test consists of submerging parts into the solution for 10 to 15 seconds and then drying the parts under a heat gun.

If the parts were cleaned properly, they will be a vibrant copper color after drying. Parts that display black or dark areas, did not receive the correct cleaning to ensure proper adhesion during the coating process.

For each part, there are predetermined trouble-areas that the Quality Assurance Department is looking for when conducting the Copper Sulfate test. These areas are generally recess patterns, under the head or within the threads for fasteners. For stampings, it tends to be any surface area where there is overlap, cavities or weld spots.

When "Best Practices" are in place, the parts will have been cleaned properly, with the adhesion and evenness of the metal finish providing a high-performance finish. And this will yield quality parts with the correct metal finish thickness and corrosion protection. Other characteristics show improved performance as well such as thread quality and torque tension results.

All inquires pertaining to parts cleaning prior to coating should be directed to the authors at **Michigan Metal Coatings Company**, or interested readers can find additional information at the company's website.
www.michiganmetalcoatings.com FTI

Company Profile:
Michigan Metal Coatings Company*, headquartered in Port Huron, MI, USA, is an ISO 9001:2015-accredited applicator of the Geomet® and Doerken® systems. The company is comprised of two facilities, having a total size of 150,000 ft² and operated by 70 dedicated employees. Michigan Metal Coatings Company provides its customers with the following features: a strong leadership team dedicated to your success, modern and efficient equipment to assure quality and speed, a fast turnover rate of only 4.2 days over the past four years and attention to quality and detail that will exceed their expectations.*

And the Michigan Metal Coatings Company mission is that the company is dedicated to the continued progression of its speed, quality and innovations, which are essential to maintaining its position as a proud leader in the metal finishing industry. To get more information on Michigan Metal Coatings Company, visit the company's website. ***www.michiganmetalcoatings.com***