

Growler Manufacturing and Engineering Corrosion Control Technology

1. Growler's corrosion process includes control of manufacturing processes, proper surface preparation and application of coatings, and inspections. Design, welding, weld quality and advanced coatings, especially CARC powder coating, are key to providing a coating for the lifetime of a product.

2. Design: Growler engineers take corrosion into consideration to ensure that all areas of a trailer can be effectively welded and coated to seal out corrosive elements. Proper design ensures that sufficient space exists for personnel and equipment to access areas for proper application of coatings.

3. Welding: All welding standards permit a certain level of porosity, undercut, overfill and other welding anomalies. While these anomalies do not necessarily affect the integrity of the weld, they do affect the integrity of the corrosion prevention coatings applied. Porosity (Figure 2), for example, may be permitted by the welding standard, but the pores cannot be effectively filled with paint (or even powder coat). This creates a particularly troubling scenario where rust forms within the material and by the time it appears on the surface significant material damage has occurred. Growler resolves that by ensuring all pores and other welding anomalies are filled or resolved in a manner that will not interfere with the integrity of paint and powder coat. While small, infrequent pores may be filled to seal out corrosive elements, larger or more frequent pores will require repair. All of Growler's weld inspectors are certified visual inspectors, including Growler's Director of Quality, who examines each weld prior to proceeding to the next step in the corrosion control process.



Figure 1 Welding of a Trailer Center Girder



Figure 2 Welding Porosity

Zinc Thermal Metal Spray (Metalizing) Theory of Operations

4. Surface Preparation. Thermal Spray coatings require a clean surface to SSPC-SP 10 (near white metal) or SP-5 (white metal) finish. The abrasive blasting removes mill scales, rust, and other coatings, as well as to provide the surface profile of no less than 2.5 mils as measured in accordance with SSPC-PA 17, using ASTM D4417 Method B (depth micrometer) to ensure good adhesion of the thermal spray coating to the target material. Growler inspects and



Figure 3 Trailer Frame Being Blasted

documents the readings from each piece of equipment at multiple locations using a digital surface and profile meter to ensure the proper profile is attained before applying any coating.

5. Growler's media facility is structured for Thermal Spray operations. Our media blast booth (Figure 3) is a large drive-in temperature-controlled booth with rail system sufficient in size to manage large pieces of equipment such as chassis for vehicles and trailers. Growler designed special rotisseries to allow technicians to rotate the chassis to virtually any angle, achieving better surface preparation. Our media booth employs a self-contained collection and filtering system for continuous operations.

Metalizing

6. Once the frame is blasted, it then moves to the zinc booth where an operator prepares the surface by cleaning with clean, dry compressed air (testing on compressed air system is performed routinely to check for oil, water and contaminants). Equipment set-up is shown in Figure 4 along with the application process. The technician applies the zinc in a cross-hatch fashion ensuring to include concave, recessed and enclosed areas. The process applies 3 – 10 mils of zinc to the substrate. Figure 5.

Metalizing applies 100% zinc over trailer and vehicle chassis and frames and top coated with CARC powder coat to provide a coating that will last the life of the vehicle.



Figure 4 Metalizing "Gun" and Application Process



Figure 5 Navy Munitions Trailer Frame Being Zinc Metalized

7. Zinc alloy coatings are important anticorrosive coatings because they are anodic to steel, meaning the zinc corrodes preferentially to steel as a sacrificial coating. The zinc also acts as a barrier to dissimilar metals. While zinc-rich primers are superior to non-zinc primers, the zinc is encapsulated in the primer matrix and are not available to act as a sacrificial layer unless exposed. Zinc metalizing, however, is applied prior to application of primer, and as a separate layer, will provide anodic corrosion protection even if not exposed.

CARC Powder Coating

8. Top Coat Application. Growler uses a two-component powder coating system for the top coat. The Primer coat is an Epoxy Resin, with a TGIC Top Coat. This combination provides very good adhesion and durability properties. The TGIC powder was color blended to meet FED-STD-595 color requirement.

9. On the Light Engineer Utility Trailer Type II (Figure 7, TACOM) program, Growler applied zinc over bare metal and top coated with Sherwin-Williams POWDURA[®], a duplex CARC powder coat system with exceptional durability. POWDURA[®] is certified to

MIL-PRF-32348 Type III and is RoHS compliant. Sherwin-Williams color formulations IAW SAE AMS-STD-595 33446 (Desert Tan), 34094 (Green) and 37030 (Black). The zinc and POWDURA[®] provides all the CARC properties and meets the requirements of MIL-DTL-53072 without the hazardous waste stream and toxicity of CARC paint while providing a highly corrosion and erosion resistant coating that can withstand temperatures in excess of 400°F.



Figure 6 Navy Munitions Trailers



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