Chromate Conversion Coatings

Common Names: Alodine, Chromate, Chromate Conversion

Applicable Specifications: Federal Specification Mil-C-5541

Description: Chromate conversion is a chemical conversion process wherein the surface of aluminum is converted to a chromate. Within limits, the thickness of the film is proportional to the time of immersion in the solution. The process stops after about five minutes of immersion.

Function & Physical Finish: The primary purpose of the chromate coating is to provide limited corrosion resistance and as a "primer" for subsequent coating operations such as powder coating or painting. The film is not abrasion resistant and can be effected by water until it is fully cured (about 24 hours). The color of the coating is dependent upon thickness and there can be considerable variation in color, from light yellow to orange to gold. Very thin coatings, sometimes referred to as "clear chromate" will not pass any corrosion tests and will usually have a faintly yellow color.

Examples of Use: Electrical components, bearing races, hardware, industrial equipment and components.

Considerations & Limitations:

- Base Material: Aluminum, Aluminum Alloys, Aluminum Castings, Aluminum Forgings.
- Shape of parts: Unlimited except that blind cavities or holes may require a subsequent repeat after repositioning to ensure adequate coverage. Assemblies are not recommended because of the potential for the solution being trapped.
- Size: Parts up to 30 inches by 30 inches by 18 inches. Maximum weight 250 lbs. Larger parts or assemblies can be process by hand spraying or swabbing.
- Quantity: Although quantity affects price, quantity is not a limiting factor. Price is determined by how many parts can be process in an hour.
- Thickness of Finish: N/A. Normally not specified.
- Masking: Can be used to protect critical machined dimensions, but adds significantly to the unit cost.
- Heat Treatment: Generally has no effect although heat treated parts may have a different color for a given thickness.
- Method of Processing: Parts may be racked, barrel or basket processed, or hand sprayed or swabbed.
- Pre-Treatment: Parts must be free of scale and clean and free from oil, grease and tape residue. Parts must be "chemically" clean prior to processing. Normal processing includes a non-etch cleaner, a caustic etch, and an acid de-smut/de-oxidize. If there are critical dimension, it should be specified that the etch should be skipped or minimized.
- Post Treatment: Following processing, parts are given a cold water rinse, a hot water rinse and compressed air is used to aid in drying.
- Packaging: ***Parts are repacked as received***. It is often necessary to wrap parts with paper to prevent scratching. This will be done at the customer's request.

Quality Control Process solutions are checked and analyzed following an established schedule and monitored using SPC techniques. Salt spray test samples can be sent to an outside laboratory at the customer's request, at an additional charge. Material used in the chromate tank meet the requirements of military specification MIL-C-81706