

ZINC PLATING

SCOPE: Sharretts Plating Co., Inc. (SPC) provides zinc plating to the commercial fastener, automotive, and industrial hardware industry for its corrosion resistance as a sacrificial metal.



ZINC PLATING APPLICATIONS

- Screws, Nuts, & Bolts
- Seat Belt Safety Components
- Break Calipers
- Fuel Lines
- Pipe Fittings & Conduit

SPC TEST METHODS

- **Appearance:** Use of 10X magnification, Luster (i.e. bright, semi-bright, or dull)
- **Thickness:** Seico 9000 X-Ray Fluorescence Spectrometry
- **Adhesion:** Cross-Hatch, No Blistering
- **Corrosion:** Neutral Salt Fog Test

This coating is an environmentally sound choice for corrosion protection since zinc is the most common element in the natural daily surroundings without toxic side effects. It is a viable replacement for cadmium plating since it shares the same attributes without the toxicity.

BEST IN PRACTICE PROCESS ADVICE

Pre-Treatment prior to zinc plating should be done by limiting the introduction of hydrogen into the basis metal through soak and anodic cleaning along with inhibitors used in conjunction with the acid activation or pickle phase.

Depending on product geometry, there are several commercially available zinc bath types. They are cyanide, alkaline non-cyanide, and acid chloride based zinc plating solutions.

Acid Chloride Baths (Best In Class)

- High Efficiency Plating Rates ($\geq 98\%$)
- Environmentally friendly
- Most Cost Effective versus the other two bath types
- Offers better corrosion resistance due to its tighter grain build structure

Alkaline Non-Cyanide Baths

- Good Throwing Power on large flat surfaces
- Plating Ratio from tip to middle is 2-1
- Poor plating efficiency (longer plate times)
- Prone more often to hydrogen embrittlement

Cyanide Baths

(Close Similarity to Alkaline non-cyanide)

- Environmentally unfriendly

ZINC PLATING (Cont.)

Passivation

Non chrome passivates are the industrial standard today to eliminate health risks and hazards for the environment. Most common passivate colors are clear, yellow, and black.



SPECIAL REQUIREMENTS

Quality systems

- Sampling plan
- Thickness Testing / Cross Sectional Analysis (done at independent lab)
- Thermal Cycling (Heat Testing) (done at independent lab)
- Neutral Salt Fog Test (done at independent lab)

Packaging and handling

TOP-COATS

Specified by end use application (Mostly Automotive): Waxes & Sealers

Post Treatment of the zinc coating is necessary only when the steel or iron parts have a hardness value equal to or greater than 33 Rockwell C or 1050 MPa (Mega-Pascal) and if the zinc plating process generates excessive hydrogen evolution during pre-treatment or plating, a general stress relief bake to relieve the hydrogen from the parts at $375 \pm 25^{\circ}\text{F}$ ($190 \pm 10^{\circ}\text{C}$) for 3 hours minimum.