



Plating Processes

*Room Temperature Antiquing &
Metal Blackening Processes*

Hot Black Oxide Finishes

Metal Cleaning & Surface Preps

Phosphate Finishes, Chromates & Rust Preventatives

Trivalent Passivate/Chromate FAQ

1) What are passivates/chromates?

Passivates/Chromates are used to coat metal parts in order to provide a longer life for the part. It is commonly used on zinc-plated parts in order to provide protection from corrosion such as white rust or red rust. Chromates can come in many different color variations: clear, blue, yellow, or black. EPI offers both hexavalent chromate and trivalent chromates in blue and yellow variations. Today many users have replaced the word chromate with passivation.

2) What makes EPI's trivalent passivation processes superior?

Other chromate processes often require multiple dips in order to achieve the desired results. With EPI's passivations, you no longer need multiple dips to achieve both a bright chromate finish and high salt spray resistance. EPI's [trivalent passivations](#) are sustainable technologies that are RoHS compliant and deliver a sustainability solution.

3) What passivation solutions does EPI offer?

EPI provides both trivalent passivation in blue and yellow finishes to meet the standards of current European Union initiatives and RoHS standards, but also provides hexavalent chromates for metal finishers to use on zinc and cadmium.

4) What is the difference between trivalent passivations and hexavalent chromates?

Hexavalent chromates were once the most commonly used chromates throughout various industries. Today metal finishing processes are moving towards trivalent chromates to meet European Union initiatives End of Life of Vehicle (ELV), sustainability solutions and RoHS. The usage of hexavalent chromates has been limited, resulting in trivalent passivations now being used more predominantly. Trivalent passivations produce a finish with lower water content providing more heat resistance. EPI's trivalent passivations address some of the major issues when switching over from hexavalent chromates:

- **Color Variability**

EPI offers both an Ultra Blue and an E-PASSivate Yellow Red passivation. Both produce a true conversion coating on plated alkaline non-cyanide and chloride zinc deposits.

- **Corrosion Resistance**

Most metal finishers are worried about getting poor results when transitioning to trivalent chromates fearing a lower corrosion resistance. However, both the E-Chrome Ultra Blue and E-PASSivate Yellow Red trivalent passivations offer high salt spray resistance on zinc plated surfaces of up to 150-250 hours to white rust, per ASTM B-117. Resistance to red rust is typically 240-450 hours, depending on zinc plate thickness. No additional top coat is needed to obtain this high degree of corrosion resistance.

- **Easy to Control – Utilizes Only a Single Dip**

Ultra Blue and E-PASSivate Yellow Red trivalent passivates can be used with automatic feeder equipment which boosts productivity.

5) What benefits can I expect from EPI's E-Chrome trivalent passivations?

E-Chrome Ultra Blue Trivalent Passivation:

- Blue Bright trivalent chromate
- Non-yellowing
- High corrosion resistance
- Single dip
- Easy to control – operator friendly
- Stable bath with long life
- Utilize for both rack and barrel passivation
- Can be used with automatic feeder equipment
- Works well on plated zinc, die cast zinc and galvanized zinc surfaces

E-PASSivate Yellow Red Trivalent Passivation:

- Hex yellow color achievable
- High corrosion resistance up to 250 hours white rust, no sealer
- Bakeable – without fading
- Single dip
- Passes the thumb test - does not wipe off easily
- Offers some UV resistance to the sun
- Easy to control – operator friendly
- Stable bath with long life
- Utilize for both rack and barrel passivation
- Can be used with automatic feeder equipment

6) What is the application process for trivalent passivation?

- Zinc plated surfaces. The brightness of the final finish will be directly related to the brightness of the plated surfaces.
- Cold water rinse
- 1% by volume Sulfuric Acid or Nitric Acid rinse to neutralize residual plating solution
- Cold water rinse
- Immersion in trivalent passivation solution for the length of time required to produce the desired finish.
- Cold water rinse
- Hot Air Dry – 150° F or higher
- No rinse after bright dip, use E-Pik 211 at 1 ounce per gallon and go right into E-PASSivate Yellow Red or E-Chrome Ultra Blue

7) Who uses hexavalent chromates and trivalent chromates?

Large companies such as lock manufactures or auto manufacturers use chromate on a large scale basis to strengthen metal parts. Below are some of the major industries that utilize both trivalent chromates and hexavalent chromates.

- Ammunition Manufacturers
- Appliance Industry
- Architectural Industry
- Auto Industry
- Collars/Coupling Industry
- Fastener Industry
- Hardware Industry
- Metal Stampers
- Military Components
- Power Hand Tool Manufacturer
- Recreational Vehicle Industry
- Tool & Die Industry