OLYMPIC SCIENTIFIC INC

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ULTRACHROMATE 300

A HEAVY DUTY CHROMATE CONVERSION COATING FOR CADMIUM

Effective: 04/19/18

Post plate chromate treatments on cadmium plate serve two main purposes.

1. They provide a better base for paint adhesion than untreated plating.
2. They render the exposed plating more passive then untreated plating thus tending to reduce oxidation of the protective coating. In the case of cadmium, this oxidation should be avoided whenever possible since it liberates hydrogen, which causes brittle fracture in high strength steels.

When high strength steels are cadmium plated, hydrogen enters the base metal and must be baked out for relief of hydrogen embrittlement. Since chromate coatings can seldom withstand more than 180 F, they are applied after baking. The problem with this procedure is that it's necessary to take the planted parts off the racks, removed maskants, bake, rerack, chromate treat and remove parts from racks.

Ultrachromate 300 can be baked up to 500 F with no loss of protective properties. Actually, baking has been found to enhance the properties even more. This makes the treatment ideally suited for low embrittlement plating on high strength steels, since the conversion coating may be applied directly after plating and prior to the hydrogen embrittlement relief bake. This way time will not only be saved, but embrittlement reliability can be improved by elimination of any wet processing after baking. Mag inspection can take place after chromating and baking also. This makes Ultrachromate 300 very unique among all other chromate conversion coatings on the market.

Ultrachromate 300 is a chemical treatment for cadmium where extreme corrosion resistance under adverse conditions is a requirement (1000 hours is salt spray consistently). The bath produces a smooth, hard, abrasion coating of rich brown to an olive drab color on bright cadmium or titanium/cadmium plate.

Ultrachromate 300 has been extensively tested and is called out by Boeing Aircraft in Ti-Cad BAC5804 and Bright-Cad BAC5701. Steel Ti-Cad plated with Ultrachromate 300 conversion coating have been known to withstand 1000 hours of salt spray without any evidence of corrosion. Ultrachromate 300 is also suitable for Porous-Cad DPS-9-28 Douglas Spec. and Nickel-Cad AMS 2416.

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GENERAL NOTES

1. More dilute baths may be used with longer immersion times to produce equivalent coatings. The coating on bright cadmium should be rich dark brown to olive drab. Blue or black coating indicates insufficient immersion times. Iridescent yellow or gold coatings usually indicate too low a concentration of Ultrachromate 300 and are more apt to occur when only sulfuric acid additions have been used to control pH.

2. Maintenance of the bath should be accomplished by adding Ultrachromate 300 concentrate to control pH and allowing the hexavalent chrome to increase until the upper limits are approached. Concentrated sulfuric acid may then be used until the hexavalent chromium is reduced by usage to around the mid-region of the hexavalent chromium range.

3. Use stoneware, glass or plastic lined tanks to contain the Ultrachromate 300 solution. Plastic or plastic coated racks or baskets should be used to hold parts in order to avoid galvanic attack due to dissimilar metal contact.

4. When Ultrachromate 300 solution is used on unbrightened or cadmium plate such as Delta Cadmium-Titanium “low embrittlement” plating for high strength steel parts, the color developed may vary considerably from that noted for bright cadmium. Because of the surface texture of such plates, the coating frequently appears light green in color; however, the coating still provides the superior corrosion resistance even after an embrittlement relief bake.

5. CAUTION: This material should be handled as a strong mineral acid. Avoid contact with the skin, flood area with water.

The instructions and information are believed to be accurate and reliable. Since the use of the products is beyond our control, no guarantee, expressed or implied, is offered. Suggestions for use of this product should not be interpreted as a recommendation that they be used in violation of any patents.

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ULTRACHROMATE 300 TECHNICAL DATA

Ultrachromate 300 is a chemical treatment for cadmium where extreme corrosion resistance under adverse conditions is a requirement. The bath produces smooth, hard, abrasion coating of rich brown to olive drab color on bright cadmium or titanium/cadmium plate. The coating may be baked up to 500° with no loss of protective properties. This makes the treatment ideally suited for low embrittlement plating on high strength steels since the conversion coating may be applied directly after plating and prior to the hydrogen embrittlement relief bake.

MAKE UP FOR CADMIUM PLATE

Dilute one part of Ultrachromate 300 with nine parts of water by volume.

MAINTENANCE OF SOLUTION

Hexavalent Chromium (as CrO_3)	2.8-5.5 oz. /gal (21-41 g/l)
pH	0.9-1.3
Temperature	Room

Adjust both chromate and pH by additions of Ultrachromate 300 concentrate. If the chromate content becomes excessive, adjust the pH with concentrated H_2SO_4.
If too low, raise with NaOH.

One gallon of Ultrachromate 300 concentrate will add approximately 35.8 oz. of Chromic acid (CrO_3) to the bath. One Liter of Ultrachromate 300 will add approximately 269 gm of Chromic acid to the bath.

ANALYTICAL PROCEDURE

1. Pipette 1 ml sample into 250 ml Erlenmeyer flask.
2. Add 100 ml H2O
3. Add 5 ml 10%w/v KI solution.
4. Add 5 ml Hydrochloric acid
5. Titrate with 0.1 N $Na_2S_2O_3$ to starch endpoint
6. Take pH of original solution

Analysis: (ml $Na_2S_2O_3$) (0.444) = oz/gal Cr^{+6}
Analysis: (ml $Na_2S_2O_3$) (3.33) = gm/L Cr^{+6}

Addition: x (0.0279) (tank size gal) = Gal UC 300
where x = set point oz/gal – analysis oz/gal
Addition: x (0.0037) (tank size L) = L UC 300
where x = set point oz/gal – analysis oz/gal

OPERATION OF THE BATH ON CADMIUM PLATE

1. Plate and rinse.
2. Immerse in Ultrachromate 300 bath for 20-40 seconds.
(Longer immersion times are required for deeper color.0

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3. Cold water rinse.
4. Air dry. Hot air may be used to facilitate drying and to accelerate curing of the coating.
5. Bake, if required, for embrittlement relief.

If Ultrachromate 300 has been used in a 5:1 dilution rate in the past, a lighter color will be experienced than normal. This film will pass 96hr. salt spray, with usually no white corrosion for 1000 hrs. To obtain a deeper color, longer immersion times will be necessary.