

## **Olympic Titanium Paste**

### **INTRODUCTION**

OLYMPIC TITANIUM PASTE is a titanium compound that yields an alkaline soluble salt upon reaction with hydrogen peroxide. As normally deposited, plating obtained from an alkaline cadmium cyanide bath containing this compound contains 0.1 - 0.7 percent titanium. This plate meets the requirements of AMS 2419, BAC 5804, MIL STD 1500, STP-58-0056 and LCP-77-2033D in providing a low hydrogen embrittlement corrosion-protective system for high strength steels while maintaining appearance and solderability characteristics.

### **ADVANTAGES**

**Economic**      Contains no fillers, filter aid or unnecessary dilutions; you purchase only titanium product.

**Low Blistering** Concentrated product allows lower hydrogen peroxide additions.

**Consistency**   Analyze our product to realize the precise quality control we maintain.

**Experience**     Our network of technical advisors assist in resolving any technical questions.

### **EQUIPMENT REQUIREMENTS**

A. For maximum low hydrogen embrittlement, it is essential the solution be free from organic and foreign contaminants. We recommend all surfaces; tank, filter, and associated plumbing that come in contact with the solution be made of, lined with, or coated with one of the following materials:

1.      300 series corrosion resistant steel
2.      Titanium or titanium alloys
3.      Epoxy primer
4.      Rigid polyvinyl chloride or polyvinyl dichloride
5.      Polytetrafluoroethylene
6.      Unfilled polyethylene or polypropylene
7.      Mylar
8.      Paralene AR. Barber-Webb Co.
9.      Hypalon 73-H3, West American Rubber Co.

B. The filter system must conform to the following requirements:

1.      Be continuous and permit the introduction of titanium paste onto filter cloth
2.      Contain sufficient free volume to accommodate all filter aid, titanium paste mixture and titanium dissolved in the bath.
3.      Be able to recycle the plating solution 2 -- 4 times per hour
4.      Have a filter cloth area greater than six square feet per 100 gallons of solution
5.      Include a carbon filter with a flow rate of less than 2 percent of the tank volume per hour
6.      Be horizontal type.
7.      Employ continuous metered hydrogen peroxide additions
8.      Include pressure gauges across filter

C. Cadmium or cadmium ball anodes in titanium holders are required.

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D. Power supply requirements:

Still plating: 6 -- 9 volts, 15 -- 16 amps per square foot

Barrel plating: 12 -- 14 volts, 10 -- 30 amps per square foot

E. We recommend digital or large and small-scale ammeters accurate to  $\pm$  5 percent.

### **CADMIUM PLATING SOLUTION**

A. Preparation of a new tank:

1. Fill tank with solution containing 4 -- 5 oz. per gallon of Sodium cyanide and 1 -- 2 oz per
2. Allow solution to stand a minimum of one week.
3. Operate pump and filter system at least 8 hours per day.
4. Remove solution prior to mixing of bath components.

B. Preparation of a new solution.

1. For each 100 gallons of solution add in the following order:
  - a. 100 pounds of Sodium cyanide
  - b. 22 pounds of Cadmium oxide.
2. Mix components until dissolved and fill tank to operation level with water with less than 10 ppm of total dissolved solids.
3. Electrolyze the solution utilizing anodes as cathodes until a plate meeting the thickness, appearance, and adhesion requirements is met.

C. Preparation of Titanium slurry:

1. Mix one gallon of slurry for each 100 gallons of plating solution.
2. In 2.5 oz. per gallon Sodium hydroxide solution mix one pound of non- -- organic `filter aid with three pounds of OLYMPIC TITANIUM PASTE.
3. Ensure that slurry is homogenous and free of lumps.
4. Use operational experience to determine any variance in ratio and quantity of material.

D. We recommend a slurry tank, however slurry may be introduced directly into tank

E. For initial charge stir five fluid ounces of 35% Hydrogen peroxide per 100 gallons of solution into tank.

F. Operate pumps, filters, etc. for 20 minutes and analyze for titanium content.

G. Add 35% Hydrogen peroxide as required to adjust titanium content to 55 -- 97 ppm.

### **MAINTENANCE OF CADMIUM TITANIUM PLATING SOLUTION**

A. Recommended solution limits:

Cadmium metal	21 -- 26 gm/L	(2.8 -- 3.5 oz/gal)
NaCN (total cyanide)	97 -- 128 gm/L	(13 --17 oz/gal)
NaOH	15 --19 gm/L	(2.0 -- 2.5 oz/gal)
Iron (total)	300 ppm maximum	
Titanium	55 -- 97 ppm	
NaCN to Cd ratio	4.0 -- 5.0: 1	
Operation temperature	15 -- 30 C	(60 -- 80 F)

B. Analyze solution and plate as necessary to maintain required bath composition and plate.

C. Adjust Cadmium, Sodium cyanide, and Sodium hydroxide concentration through direct addition.

D. Titanium concentration of bath and plate may be increased by addition of 35% hydrogen peroxide.

1. If hydrogen peroxide additions fail to increase the titanium content of bath and plate the paste is probably depleted. In this case the filter should be recharged as in preparation of new bath. One pound of paste should be more than adequate for 6,500-amp hours of plating time.

2. An improperly operating filter system will result in inability to raise the titanium content with hydrogen peroxide additions
3. We recommend analysis for titanium in bath or plate once per eight hours of operation, when batch additions of peroxide are made, once per 24 hours of operation when continuous metered additions are made. If the bath has been non-operational for 24 hours analyze the bath and plate prior to processing the first load.
4. Excess Sodium carbonate may be removed using any standard method applicable to Cadmium cyanide baths. Ensure that any salt used to precipitate carbonate does not introduce foreign material into the bath. Avoid excessive amounts of salts. Instrumental detection of hydrogen must be performed subsequent to any carbonate treatment.

### **STORAGE**

Olympic Titanium Paste is a perishable product. Paste should not be allowed to freeze. Paste shall be stored at temperatures less than 25 centigrade.

### **ANALYTICAL PROCEDURES**

Analytical Procedures are available from Olympic Scientific Inc.