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COLMATTE Sn

TECHNICAL DATA

06-07-13

COLMATTE Sn

MATTE ACID TIN PLATING PROCESS

COLMATTE Sn	is a stable leveling, matte acid tin plating process that produces a soft white to gray matte finish, exhibiting excellent solderability.
COLMATTE Sn	baths operate over a wide concentration permitting highly economical deposition from baths with low tin metal content.
COLMATTE Sn	baths are maintained with two additives, which are not consumed during electroplating, however, the additives are lost via drag-out. The additives must be replaced according to volume of drag-out.
COLMATTE Sn	additives are stable so organics are minimally co-deposited with the tin.
COLMATTE Sn	process is extremely simple to control, requiring only a fraction of the lab and analysis time needed by competitive systems.

PREPARATION OF PLATING SOLUTION

COLMATTE Sn additives work best when used in tin baths prepared as follows:

		<u>100 GALLONS</u>	<u>100 LITERS</u>
<u>BARREL</u>	Stannous Sulfate:	46 pounds	5.56 kg
<u>RACK</u>	Stannous Sulfate:	59 pounds	7.1 kg
	Sulfuric Acid C.P.	10 gallons	10 liters
	COLGLEAM Sn MAKEUP	2.5 gallons	2.5 liters
	COLMATTE Sn MAINTENANCE	1 gallon	1.0 liter

1. Using protective clothing, gloves, eyeshields, etc., cautiously add the required amount of sulfuric acid to the plating tank which contains approximately half the final volume of cold water. Stir continuously during addition. Do not allow solution temperature to exceed 150°F during mixing. If a new tank is used for makeup, it should be leached with 5% sulfuric acid for at least 24 hours prior to use.

2. In a separate container prepare a slurry of stannous sulfate in cold water and slowly add this to the above sulfuric acid mixture with continuous stirring.
3. Fill the tank with cold water to a few inches of final operating level.
4. Continue mixing and allow tank to cool to approximately 75° to 80° F (24° to 26° C).
5. Dilute the required amounts of COLGLEAM Sn MAKEUP and COLMATTE Sn MAINTENANCE with approximately equal amounts of water and add to the bath in the above order slowly with good mixing.
6. Fill the tank to final operating level. No dummyming or working in period is required.

RECOMMENDED OPERATING CONDITIONS

A solution prepared as above will have the following composition and should be operated as follows:

	<u>OPTIMUM</u>	<u>WORKING RANGE</u>
Tin Metal (barrel):	3.0 oz/gal (22.5 g/l)	2.5 - 7.0 oz/gal (18.75 - 52.5 g/l)
Tin Metal (rack):	5.0 oz/gal (37.5 g/l)	4.0 - 8.0 oz/gal (30 - 60 g/l)
Sulfuric Acid:	10% by volume	8 - 12% by volume
COLGLEAM Sn MAKEUP:	2.5% by volume	2 - 4% by volume
COLMATTE Sn MAINTENANCE:	1% by volume	0.5 - 2% by volume
Temperature:	70° F (21° C)	60° - 90° F (15° - 32° C)
Average Anode Current Dens.:	10 amps/sq. ft. (1 amp/sq. dm)	1 -30 amps/sq. ft. (0.1 - 3.25 amps/sq. dm)
Average Cathode Current Dens.:	15 amps/sq. ft. (1.6 amps/sq. dm)	5 - 30 amps/sq. ft. 0.5 - 3.25 amps/sq. dm)
Agitation: Cathode Rod: (Not required for barrel plating)	10 ft./min. (3 m/min)	3 to 25 ft./min. 1m - 7.5 m/min)
Voltage:	6 volts low ripple DC	
Cooling Coils:	Teflon or teflon coated copper preferred	
Filtration:	Continuous, through polypropylene fiber wound cartridges	
Anodes:	99.99% pure tin slabs	
Anode Hooks:	Monel or titanium, plastisol coated	
Anode Bags:	Not normally required	
Plating Tank:	Steel lined with polyethylene, polypropylene, PVC neoprene, or acid res. fiberglass	

BATH CONTROL & MAINTENANCE

NOTE: Always dilute the COLMATTE Sn additives with equal amounts of water before adding to tank. Mix well during additions.

Maintenance and control of the COLMATTE Sn process is extremely simple. COLMATTE Sn additives are not consumed during the electroplating process. However, the additives are lost during the drag-out process. The additives should be replaced in accordance with the drag-out rate. The best way to judge the amount of drag out is by determining the amount of sulfuric acid needed to be replaced. When acid additions are made, add 1 quart (1 liter) of COLGLEAM Sn MAKEUP and 13 fluid oz. (380 ml) COLMATTE Sn MAINTENANCE for each gallon of sulfuric acid.

Tin metal and sulfuric acid contents should be analyzed on a regular basis depending upon bath use and drag-out, and should be maintained within recommended limits.

HANDLING & STORAGE

Use normal precautions when handling COLMATTE Sn additives - wear protective clothing, rubber gloves, and adequate eye protection. As with most chemicals, use in well ventilated areas. Working plating baths employing COLMATTE Sn additives are acidic, and all the customary precautions associated with the use of acidic solutions should be observed.

COLMATTE Sn additives should be stored away from heat and not be allowed to freeze. If freezing occurs, warm the container in hot water to re-dissolve ingredients that have come out of solution.

FREEZABILITY: As with most chemical products, it is preferable that freezing be avoided. However if freezing should occur during transportation or storage, directions for handling the products covered in this technical data sheet are as follows:

If COLMATTE Sn MAINTENANCE freezes, simply allow the container to completely thaw and bring to room temperature of 70-75F/ 21-24C. Thoroughly mix to bring back to original condition.

If COLGLEAM Sn MAKEUP freezes, simply allow the container to completely thaw and bring to room temperature of 70-75F/ 21-24C.

NON-WARRANTY

The data contained in this bulletin is believed by Columbia Chemical Corp. to be accurate, true and complete. Since however, final methods of use of these products are in the hands of the customer and beyond our control, we cannot guarantee that the customer will obtain the results described in this bulletin, nor can we assume any responsibility for the use of this product by the customer in any process which may infringe the patents of third parties.

ANALYSIS OF COLMATTE Sn BATHS

Analysis for Stannous Sulfate

1. Pipette 5 ml tin plating solution into a 500 ml Erlenmeyer flask;
2. Add 100 ml Deionized Water;
3. Add 50 ml Concentrated HCl;
4. Add about 1/2 gram Sodium Bicarbonate slowly, to dispel air;
5. Add 1 cc Starch Indicator Solution;
6. Titrate with 0.1N Potassium Iodate to a blue color which persists for 30 seconds.

FACTOR: (ml 0.1N Iodate titrated) \cdot 0.287 = oz/gal Stannous Sulfate (oz/gal \times 7.5 = g/l)

FACTOR: (ml 0.1N Iodate titrated) \cdot 0.158 = oz/gal Tin Metal (oz/gal \times 7.5 = g/l)

Analysis for Sulfuric Acid

1. Pipette 5 ml tin plating solution into a 250 ml Erlenmeyer flask;
2. Add 50 ml of 4% Ammonium Oxalate Solution;
3. Add 5 ml Methyl Red Indicator;
4. Titrate with 0.1N NaOH to color change from red to yellow.

FACTOR: (ml 1.0N NaOH titrated) \cdot 0.53 = % by volume H₂SO₄