PRODUCT INFORMATION

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MARTRON SN 44

Matte Acid Tin or Tin Lead Plating Process for both Sulfate, MSA and Fluoborate Processes

Section 1: DESCRIPTION

The **Martron SN 44** process is a highly reliable, single additive system for depositing matte coatings from tin or tin-lead electrolytes. Sulfate electrolytes may be either sulfuric acid- based sulfate processes of processes derived from methane sulfonic acid or MSA for depositing matte tin coatings. Tin Lead alloy processes may utilize either fluoborate or again methane sulfonic acid chemistry.

Regardless of the electrolyte used, deposits are very fine grained and uniform in appearance. Deposits are also ductile and contain a low amount of occluded organic, so they have excellent solder ability.

Through the proper choice of operating bath formulation, the **Martron SN 44** process can be used for depositing tin or tin-lead coatings via either barrel or rack plating techniques, or via strip, wire, or tab plating methods.

Section 2: SALES FEATURES

Versatile process which can be used for either rack or barrel plating techniques as well as high speed strip plating.
Uniform deposit appearance at all current densities.
High reliability in production; minimal operator attention is required.
Tolerant to higher operating bath temperatures.
Excellent solder ability and re-flow characteristics.
Low make-up and operating cost.
Addition Agent is stable upon standing in an idle bath.
Deposits are resistant to staining and discoloring.

Section 3: SOLUTION COMPOSITION and OPERATING CONDITIONS

Matte Tin Deposits from a Sulfate Electrolyte

	Range	Rack/Barrel	High Speed
Tin Metal	7.5-67.5 g/l (1.0-9.0 opg)	15 g/l (2.0 opg)	60 g/l (8 opg)
(as Stannous Sulfate)	15.0-135.0 g/l (2.0-12.0 opg)	30 g/l (4.0 opg)	120 g/l (16 opg)
Sulfuric Acid (66 Be)	8-12% vol	10% vol	8% vol
Martron SN 44	4.0-6.0% vol	4.0% vol	6.0% vol
Temperature	18-31 C (65-88 F)	Same	Same
Agitation	Movement via filter	Same	Same

Cathode Current Density	5-250 ASF	5-100 ASF	100-250 ASF
Anode Current Density	15-30 ASF	Same	Same
Anodes	99.99% Pure Tin		
Anode Bags	None	None	None
Filtration	Continuous	Same	Same
Voltage	3-9 volts	3-9 volts	3-4 volts

Section 4: SOLUTION PREPARATION

1. Fill operating tank to approximately 50% of its working volume with cold water.
2. Very slowly add correct amount of conc. sulfuric acid. Mix well.
3. Add the correct amount of stannous sulfate and mix well to dissolve.
4. Dilute bath to approximately 95% of its working volume and mix well.
5. Allow solution to cool to room temperature.
6. Add correct amount of **Martron SN 44** and mix well.
7. Dilute bath to final volume and mix well.

Matte Tin Deposits from a Methane Sulfonic Acid Electrolyte:

	Range	**Rack/Barrel**	**High Speed**
Tin Metal	7.5 - 90.0 g/l (1.0-12.0 opg)	15 g/l (2.0 opg)	75.0 g/l (10.0 opg)
(as Stannous Methane Sulfonate) 400 g/l Stannous Methane Sulfonate	12.5 -150.0 g/l (1.7-20.0 opg)	25.0 g/l (3.3 opg)	120 g/l (16 opg)
Methane Sulfonic Acid	(70%) 8-14% vol	10% vol	12.5% vol
Martron SN 44	5.0-15.0% vol	6.0% vol	12.0% vol
Temperature	18-52°C (65-12F°F)	80°F	115°F
Agitation	Movement via filter	Same	Same
Cathode Current Density	5-250 ASF	5-100 ASF	40-250 ASF
Anode Current Density	15-30 ASF	Same	Same
Anodes	99.99% Pure Tin		
Anode Bags	None	None	None
Filtration	Continuous	Same	Same
Voltage	3-9 volts	3-9 volts	3-4 volts

Section 5: SOLUTION PREPARATION

1. Fill operating tank to approximately 50% of its working volume with cold water.
2. Very slowly add correct amount of 70% methane sulfonic acid. Mix well.
3. Add the correct amount of 400 g/l stannous methane sulfonate and mix well to dissolve.
4. Dilute bath to approximately 95% of its working volume and mix well.
5. Allow solution to cool to room temperature.

6. Add correct amount of **Martron SN 44** and mix well.
7. Dilute bath to final volume and mix well.

Section 6: CONTROL

The control of an operating solution is simple and straight forward. Standard wet chemical analysis should be used to determine the metal and acid concentrations. The frequency of analysis depends on how heavily the bath is used in production. Additionally, Hull cell, or other small-scale plating tests, should be run periodically to determine the concentration of **Martron SN 44**, and to determine if any impurities are present that are detrimental to performance.

Section 7: OPERATING CONSIDERATIONS

Metal Concentration

The Prime factor in maintaining the correct metal concentration in the bath is utilizing the proper anode area. This ensures a uniform replenishment of the metal plated out of the solution. Drag out can influence consumption in barrel and rack operations but is not significant for high speed strip, wire, or tab plating installations. In the case of tin-lead plating it is important to utilize the proper composition of anode.

The **Martron SN 44** process offers consistent performance over a relatively wide range of concentrations, so bath control is not critical. The concentration can vary by approximately 10% without affecting plating quality.

A low metal concentration reduces the maximum current density at which plating can take place without burning occurring. Additionally, in high speed plating, a low metal concentration will reduce cathode efficiency. Conversely, a high metal concentration can decrease throwing power.

Acid Concentration

A low acid concentration (either sulfuric, MSA, or fluoboric) can produce very dull low current density areas, and decrease throwing power, similar to high metal concentration. A very low concentration can lead to anode polarization, as can a very high acid concentration.

Addition Agents

The level of **Martron SN 44** maintained in the bath determines the maximum current density possible without burning occurring, and the degree of grain refinement. A low concentration of **Martron SN 44** results in dark gray to black low current density deposits, and in an extreme case, skip plating in the same areas. A high concentration has no noticeable effect.

In situations where adjustment additions of **Martron SN 44** are needed, they should be made in 0.10-0.15% increments to the operating bath. Also, if plating tests consistently show the need for extra additions, replenishment amounts should be increased accordingly. This will provide more uniform bath performance.

Martron SN 44 Purifier may be used for periodic treatments for stannic tin in the sulfate plating solution. Additions of 0.025% to 0.05% by volume (95ml to 190ml per 100 gallons) may be added to assist in the separation and settling of the stannic tin from the working solution. Periodic treatments will result in better process performance and improved solution appearance.

Section 8: REPLENISHMENT ADDITIONS

Martron SN 44 is consumed through electrolysis and drag out. It can be added at the rate of 5,000-10,000-amp hours/gallon. One liter of additive is consumed every 1325-2650-amp hour of plating.

Section 9: SAFETY PRECAUTIONS

Always read the Safety Data Sheet (SDS) for any chemical product to ensure familiarity with the methods of safe handling and the health hazards associated with the product.

Section 10: NON-WARRANTY

The data contained in this bulletin is believed by ***Martron Inc.*** to be true, accurate and complete. Since, however, final methods of use of this product 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.