RONASTAN™ TP-SR
ELECTROLYTIC TIN PROCESS

For Industrial Finishing Applications

Regional Product Availability			
N. America	Japan/Korea	Asia	Europe
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DESCRIPTION

The Ronastan TP-SR electroplating process is specifically formulated for use in high-speed continuous steel strip tin plating operations.

ADVANTAGES

- Based on a biodegradable acid; effluent treatment can be readily achieved with standard neutralization and filtration procedures
- Extremely wide temperature range 21–65°C (70–149°F) allowing bath operation at high current densities
- Wide current density range permitting economical bath operation at reduced tin concentrations
- Supplied as liquid concentrates, which facilitate the use of automatic replenishment systems
- StannGuard Antioxidant ensures resistance to the formation of insoluble decomposition products

DEPOSIT DATA

Structure:	Fine grained, matte
Composition:	100% Tin
Density:	7.3 g/cm^3
Melting Point:	232°C (450°F)

BATH MAKE-UP (HORIZONTALLY ORIENTED)

Chemicals Required	Metric	(U.S.)
Deionized Water:	700 ml/l	(70% v/v)
Ronastan TP Acid 70:	20–50 ml/l	(2–5% v/v)
Sulphuric Acid 96%:	1.1 ml/l	(0.11% v/v)
Ronastan TP Tin 300 Concentrate:	40–80 ml/l	(4–8% v/v)
Ronastan TP-SR Make-up:	40–60 ml/l	(4–6% v/v)
StannGuard Antioxidant:	20 ml/l	(2% v/v)
Deionized Water:	to volume	(to volume)

BATH MAKE-UP (VERTICALLY ORIENTED)

Chemicals Required	Metric	(U.S.)
Deionized Water:	600 ml/l	(60% v/v)
Ronastan TP Acid 70:	30–60 ml/l	(3–6% v/v)
Sulphuric Acid 96%:	1.1 ml/l	(0.11% v/v)
Ronastan TP Tin 300 Concentrate:	40–100 ml/l	(4–10% v/v)
Ronastan TP-SR Make-up:	40–60 ml/l	(4–6% v/v)
StannGuard Antioxidant:	20 ml/l	(2% v/v)
Deionized Water:	to volume	(to volume)

MAKE-UP PROCEDURE

1. Add deionized water to tank.
2. Add Ronastan TP Acid 70 and mix thoroughly.
3. Add Sulphuric Acid 96% and mix thoroughly.
4. Add StannGuard Antioxidant and mix thoroughly.
5. Add Ronastan TP Tin 300 Concentrate and mix thoroughly.
6. Add Ronastan TP-SR Make-up or Ronastan TP-SR Additive and mix thoroughly.
7. Dilute to final volume with deionised water.

RONASTAN TP-SR ELECTROLYTIC TIN PROCESS

Operating Parameters—Horizontally Oriented

Parameter	Range	Recommended
Tin Metal	8–24 g/l (1.1–3.2 oz./gal.)	15 g/l* (2 oz./gal.)
Ronastan TP Acid 70 (free)	20–50 ml/l (2–5% v/v)	30 ml/l** (3% v/v)
Ronastan TP-SR Replenisher (NA)	8–12 ml/l (0.8–1.2% v/v)	10 ml/l (1% v/v)
StannGuard Antioxidant	15–25 ml/l (1.5–2.5% v/v)	20 ml/l (2.0% v/v)
Sulphuric Acid 96%	1–3 g/l (0.13–0.40 oz./gal.)	2 g/l (0.2 oz./gal.)
Temperature	21–65°C (70–149°F)	45°C* (113°F)
Cathode Current Density	5–75 A/dm^2 (50–750 A/ft^2)	Dependent upon equipment design and production requirements
Anode to Cathode Ratio	1:1	
Cathode Efficiency	90–100%	
Deposition Rate	0.18 microns per second at 20 ASD (7.2 microinches per second at 200 ASF) 1.31 g/m^2 per second at 20 ASD	

*Dependent upon current density requirements.

**Dependent upon conductivity requirements.

Operating Parameters—Vertically Oriented

Parameter	Range	Recommended
Tin Metal	8–24 g/l (1.1–3.2 oz./gal.)	15 g/l* (2 oz./gal.)
Ronastan TP Acid 70 (free)	30–60 ml/l (3–6% v/v)	40 ml/l** (4% v/v)
Ronastan TP-SR Replenisher (NA)	8–12 ml/l (0.8–1.2% v/v)	10 ml/l (1% v/v)
StannGuard Antioxidant	15–25 ml/l (1.5–2.5% v/v)	20 ml/l (2.0% v/v)
Sulphuric Acid 96%	1–3 g/l (0.13–0.40 oz./gal.)	2 g/l (0.2 oz./gal.)
Temperature	21–65°C (70–149°F)	45°C* (113°F)
Cathode Current Density	5–75 A/dm^2 (50–750 A/ft^2)	Dependent upon equipment design and production requirements
Cathode Efficiency	90–100%	
Deposition Rate	0.18 microns per second at 20 ASD (7.2 microinches per second at 200 ASF) 1.31 g/m^2 per second at 20 ASD	

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**Dependent upon conductivity requirements.

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BATH MAINTENANCE

Ronastan TP-SR Replenisher (NA)

Ronastan TP-SR Replenisher (NA) is required to maintain operating current density range and deposit grain refinement. When using Ronastan TP-SR Replenisher (NA), it should be added based upon analysis to maintain the concentration between 8–12 ml/l (0.8–1.2% v/v).

Ronastan TP Tin 300 Concentrate

The replenishment of tin should be maintained through the soluble tin anodes and controlled by balancing with insoluble anode. If additional tin is required, replenish using Ronastan TP Tin 300 Concentrate.

StannGuard Antioxidant

StannGuard Antioxidant is required to minimize the loss of tin due to oxidation. StannGuard Antioxidant should be added based on analysis to maintain the concentration at 20 ml/l. See Rohm and Haas Electronic Materials Analytical Procedure for Determination of StannGuard Antioxidant by UV Spectrophotometry.

Ronastan TP Acid 70

To raise acid concentration 1% v/v, add 10 ml/l Ronastan TP Acid 70.

Sulphuric Acid

To raise sulphuric acid concentration 1 g/l, add 0.54 ml/l concentrated sulphuric acid. If filtration needs to be improved, raise H_2SO_4 to 5 g/l.

Ronastan TP Defoamer

Under normal circumstances, a defoamer should not be necessary. In case of excessive foaming of the Ronastan TP-SR plating solution or rinse tank, use Ronastan TP Defoamer. Make a stock solution by dissolving 5 ml Ronastan TP Defoamer in 1 liter of water. Make additions of 2 ml of Ronastan TP Defoamer for every 10,000 liters plating solution. Maintain as required. Additions should be made to the recirculation tank.

Ronastan TP Flux Concentrate

It is the alternative to conventional fluxes and promotes a superior. stain-free, reflowed tin plate product. It is tolerant of flux contamination and may thus be used when rinsing capabilities are limited. It should be added at 5–25 ml/l, depending on requirements. Maintain according to drag out. Inquire for regional availability of this product.

EQUIPMENT

Tanks:	Rubber-lined steel, polypropylene, polyethylene or PVDC
Anodes:	Pure tin, minimum Grade A quality with iridium dioxide coated titanium insoluble anodes at a ration of 9:1
Heaters:	316 Stainless steel, silica sheathed or PTFE coated

EQUIPMENT PREPARATION

Prior to make-up, the process tank and ancillary equipment should be thoroughly cleaned and then leached with a sulphuric acid solution.

This procedure is particularly important for new equipment or equipment previously used with other processes.

Cleaning Solution

Sodium Hydroxide: 15 g/l (2 oz./gal.)

Leaching Solution

Sulphuric Acid 96%: 50 ml/l (5% v/v)

PROCEDURE

1. Thoroughly wash down all tanks and ancillary equipment with clean water.
2. Recirculate water through complete system to remove water soluble materials.
3. Discard water.
4. Add cleaning solution to reservoir tank, heat to 55–60°C (131–140°F) and recirculate through complete system.
5. Discard cleaning solution.
6. Recirculate clean water through complete system.
7. Discard water.
8. Add leaching solution to reservoir tank and recirculate through complete system.
9. Leave leaching solution in reservoir tank for a minimum of 8 hours.
10. Recirculate leaching solution through complete system.
11. Discard leaching solution.
12. Recirculate clean water through complete system.
13. Discard water.

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PRODUCT DATA

For the specific Product Data values, please refer to the Certificate of Analysis provided with the shipment of the product(s).

ASSOCIATED PRODUCTS

Ronastan TP-SR Make-up
Ronastan TP-SR Replenisher (NA)
Ronastan TP Tin 300 Concentrate
StannGuard Antioxidant
Ronastan TP Acid 70
Ronastan TP Defoamer
Ronastan TP Flux Concentrate

HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

CAUTION! Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Rohm and Haas Electronic Materials Technical Representative for more information.

UNITED STATES
Marlborough, MA
Tel: 800.832.6200
Fax: 508.485.9113
Freeport, NY
Tel: 800.645.2996
Fax: 516.868.8074

JAPAN
Tokyo
Tel: +81.3.5213.2910
Fax: +81.3.5213.2911

ASIA
Hong Kong
Tel: +852.2680.6888
Fax: +852.2680.6333

EUROPE
Paris, France
Tel: +33.1.40.02.54.00
Fax: +33.1.40.02.54.07

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