Prime Chemicals-Pakistan

TEKNOLUME BRIGHT ACID TIN PROCESS

The TEKNOLUME BRIGHT ACID TIN plating solution gives a mirror bright pure tin deposit with excellent tarnish and corrosion resistance. The process yields easily solderable deposits and can be used in bath rack and barrel plating. The electrolyte is highly stable and easily maintainable.

SALIENT FEATURES:

Operating over a wide range.
Highly stable electrolyte and does not undergo any changes during idling periods. Excellent ductility and solderability even after storage.
Low brightner consumption.

SOLUTION COMPOSITION	**RANGE**	**Optimum**
Stannous sulphate →	24–35 g/l	30 g/l
Sulphuric Acid →	90–110 g/l	100 g/l
TEKNOLUME CARRIER ADDITIVE →	20–40 ml/l	30 g/l
TEKNOLUME BRIGHTNER →	2–6 ml/l.	3 ml/l

Range

24.0 - 35.0 g/l 90 - 110 ml/l 20 - 40 ml/l

2 - 6 ml/l

OPERATING CONDITIONS

Temperature → Cathode current density → Anode current density → Filtration → Agitation → Anodes →

BATH PREPARATION

20-30° C
0.5 - 3.5 A/dm.sq.
1.0 - 2.0 A/dm.sq Recommended. Cathode rod movement. 99.99% pure tin.

- The new plating tank should be leached with 3-5% by volume sulphuric acid and 1.0 ml/l TEKNOLUME CARRIER ADDITIVE. Leave the leaching, solution overnight in the plating tank. After leaching, drain the leaching solution and rinse the tank with clean water.
- Fill the plating tank with distilled or deionised water to half of its working level. Add cautiously 10% by volume C.P. grade sulphuric acid.
- Add calculated quantity of Stannous sulphate preferably after making slurry of it in distilled water, with continuous stirring. Make up the level and allow it to cool to room temperature.
- Add the calculated amount of TEKNOLUME CARRIER ADDITIVE and TEKNOLUME BRIGHTNER and start plating.

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25° C
0.5 – 1.0 A/dm.sq 1.0 A/dm.sq.

PRE -TREATMENT

As is true of all plating processes the pre-treatment plays the major role in the final finish. All traces of rust and scale must be removed before the parts proceeds to electrolytic cleaning. A sulphuric acid dip is recommended prior to the plating. Hydrochloric acid dip must be avoided as a chloride content above 400 mg/l affects the low current density brightness. Brass parts should be plated with 2 – 3 microns of copper or nickel prior to the tin plating to prevent migration of Zinc into the tin deposit. Migration of Zinc will cause poor solderability and discolour the tin finish.

EQUIPMENT REQUIRED

- **TANKS :** Polyethylene or flexible PVC lined mild steel tanks are recommended. For medium size installations PVC reinforced fibre glass tanks can be used.
- **AGITATION :** Solution agitation or cathode rod movement is recommended.
- **ANODES :** Pure tin (99.99%) anodes with titanium hooks are recommended.

  Polypropylene anode bags are recommended.

- **HEATING AND COOLING :** The temperature of the electrolyte is to be maintained

  between 20 - 30°C to get optimum results. So cooling arrangement has to be made to maintain the temperature within the recommended range as temperature above 35°C reduces the brightness at low current density areas. Coils made from Teflon or lead are recommended. Steel pipes coated with plastic capable of withstanding 25% sulphuric acid at 35°C can also be used.

- **POWER SOURCE :** Six volt rectifiers with maximum residual ripple content of 5% is recommended.
- **FILTRATION :** For rack plating 10 micron polypropylene cartridge filter is recommended.

BATH MAINTENANCE

Tin metal content and sulphuric acid concentration should be maintained as follows:

Tin metal	**Range**	**Optimum**
Rack	10 – 30g/l	15g/l
Barrel	7.5-16g/l.	10g/l
Sulphuric acid		
Rack	70-100ml/l	90ml/l
Barrel.	80-120ml/l	100ml/l

A lower tin content is recommended for barrel plating to minimise the dragout losses. Teknolume Carrier additive and Brightner replenishment depends upon degree of brilliance required, dragout loss and temperature, the quantity recommended in normal condition is

TEKNOLUME BRIGHTNER 100 – 200 CC/KAH

TEKNOLUME CARRIER ADDITIVE 200 – 300 CC/KAH

In Barrel plating the Teknolume Carrier additive shall be consumed more than Rack plating.

ANALYTICAL CONTROL

Apparatus needed

2 ml Pipette, 5 ml Pipette, 10 ml Pipette, 50 ml Burette, 100 ml Graduated cylinder, 250 mlErlenmeyer Flask.

Reagents Needed

0.1 N Potassium Iodate (KIO_3) solution.
Dissolve 3.57 gms of Potassium Iodate in deionized or distilled water and dilute to one litre.
Starch Indicator Solution, 20% sulphuric acid solution.
Cautiously add 20 ml concentrated sulphuric acid (A.R.) to 80 ml of deionized water.

PROCEDURE

Pipette 5 ml of Teknolume tin operating solution into 250 ml Erlenmeyer Flask.
Add 20 ml of the 20% Sulphuric acid solution and titrate with 0.1 N Potassium Iodate solution to a purple end point.

Add about 2 ml of starch indicator solution and titrate with 0.1 N Potassium Iodate solution to a purple end point.

CALCULATION

(ml of KIO_3 titrated) X Normality KIO_3 X 21.5 = g/l of Stannous Sulphate.

ANALYSIS FOR FREE SULPHURIC ACID

Apparatus : 5 ml Pipette, 50 ml Burette, 100 ml Graduated cylinder, 250 ml Erlenmeyer Flask.

Reagents

4% Ammonium oxalate solution.
Dissolve 40 gms of C.P. Grade Sodium Hydroxide pellets inn 500ml of distilled water and dilute to one litre.
1% Methyl red indicator
Dissolve 1.0 gm of Methyl red Sodium salt in 100 ml of deionized water.
Note : Do not use Alcohol based Methyl red indicator.

PROCEDURE

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Pipette 5 ml of Teknolume tin operating solution into 250 ml Erlenmeyer Flask.
Add 100 ml of the 4% Ammonium Oxalate solution and drops of the Methyl Red indicator.

Titrate with 0.1 N Sodium Hydroxide solution till the colour changes from red to yellow.

CALCULATION

(ml of NaOH titrated) X Normality NaOH X 5.3 = ml/l of Sulphuric acid.

WASTE TREATMENT

The Teknolume bath contains tin metal and sulphate and is acidic in nature. It should be neutralised to a pH of 7.5 – 8.0 prior to disposal via the sewage system.

CONVERSION OF EXISTING BATH

The Conversion can be easily carried out by adjusting the stannous sulphate and Sulphuric acid content after analysing the bath. Plating cell tests with the new brightner system will help in converting the existing system. Before conversion a 1 litre sample of the existing bath should be sent to the ARTEK laboratory for necessary recommendation.

CAUTION

Teknolume bath is acidic in nature and contains sulphuric acid so normal precautions are to be taken while handling the electrolyte.

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