Seacole Specialty Chemical

Technical Data Sheet

E-TIN 34

A Solderable Immersion Tin

Product Description

E-TIN 34 is a simple to operate, ready to use, stable, replenishable, electroless/immersion tin-plating solution designed for use as an alternative solderable finish to hot air leveling (HAL). E-TIN 34's unique organic acid based formula will produce a thick, level, highly solderable deposit of tin (up to 100 micro-inches) on copper and copper based alloy substrates; even if the substrate is highly oxidized. Additionally, the tin deposit exhibits excellent long term solder-ability when stored in nominal environments (the resulting tin deposit meets or exceeds IPC-TM-650), yields a flat and uniform surface for SMDs, will not interfere with standard printed circuit board electrical testing, and does not introduce metallic contaminants into solder pots or solder joints (gold, palladium, and/or silver), believed to contribute to solder joint embrittlement.

E-TIN 34 is also very economical to use. The product is compatible with most solder masks and plating resists, and can also be used as an etch resist in alkaline final etching operations, or to restore solder-ability to exposed copper, aged tin or solder finishes.

Physical Specifications

Parameter	E-TIN 34	E-TIN 34 PRE-DIP
Physical State	Liquid	Liquid
Appearance	Transparent Yellow	Transparent Yellow
Odor	Mild Amine	Mild Amine
Freeze/Thaw Stability	Do Not Freeze	Do Not Freeze
Specific Gravity	1.13	1.10
pH	< 1	< 1

Equipment Requirements

Tanks: Constructed of polypropylene, polyethylene, PVC, CPVC, or steel lined.
Racks: Constructed of plastisol-coated steel.
Heaters: Teflon.
Ventilation: Recommended
NOTE: E-TIN 34 IS NOT COMPATIBLE WITH TITANIUM.

Product Make-Up

E-TIN 34 and E-TIN 34 PRE-DIP are employed at full strength and should not be diluted or combined with other additives prior to use.

Operating Parameters
E-TIN 34 PRE-DIP

Parameter	Range	Optimum
Temperature	Ambient	Not Applicable
Immersion Time	1 Minute	1 Minute
Agitation	Mechanical Or Flood Rinse	N/A
Ventilation	Recommended	N/A
Filtration	Recommended	N/A

E-TIN 34

Parameter	Range	Optimum
Temperature	70-160°F	Based Upon Desired Thickness Of Tin Deposit
Immersion Time	2-30 Minutes	Based Upon Desired Thickness Of Tin Deposit
Agitation	Mechanical Or Flood Rinse	N/A
Ventilation	Recommended	N/A
Filtration	Recommended	N/A

Recommended optimum process line for use as a final finish is as follows:

1. Standard alkaline (or acid) cleaner such as Seacole's BASIC/Lean.
2. Duel cascading water rinse.
3. Standard micro-etch (30-40 micro-inches) such as Seacole's ENVIRO/Etch.
4. 5% sulfuric dip.
5. Dead rinse.
6. Flowing rinse.
7. E-TIN 34 PRE-DIP.
8. E-TIN 34.
9. Water Rinse
10. RINSE/Aid AH-1
11. Duel cascading water rinse.
12. Dry

Parameter	Description	Chemistry	Dwell Time	Agitation	Temp (°F)	Heater	Filtration	Ventilation
Station 1	Alkaline or Acid Soak Cleaner	BASI/Clean SC-10, 10%	5 minutes	Mechanical bar or flood rinse	125°F	Steel, Quartz, or Teflon	None	Required
Station 2	Water rinse, tap	Continuously flowing at 2-3 gpm	1 minute	Mechanical bar or horizontal spray	Ambient	None	None	N/A
Station 3	Water rinse, tap	Continuously flowing at 2-3 gpm	1 minute	Mechanical bar or horizontal spray	Ambient	None	None	N/A
Station 4	Micro-Etch 30-40 u"/min.	ENVIRO/Etch 3% Replenisher 76% Make-Up	1 minute	Mechanical bar or horizontal spray	90°F	Quartz or Teflon	None	Required
Station 5	Sulfuric acid post-dip	5% sulfuric acid post dip	1 minute	Mechanical bar or horizontal spray	Ambient	None	None	N/A
Station 6	Water rinse, tap	Dead Rinse	1 minute	Mechanical bar or horizontal spray	Ambient	None	None	N/A
Station 7	Water rinse, tap	Continuously flowing at 2-3 gpm	1 minute	Mechanical bar or horizontal spray	Ambient	None	None	N/A
Station 8	Pre-dip	E-TIN 34 PRE-DIP	1 minute	Mechanical bar or horizontal flood rinse	Ambient	None	None	Required
Station 8	High build tin	E-TIN 34 100%	15-20 min	Mechanical bar or horizontal flood rinse	140 F	Teflon	Continuous 10 micron polypro	Required
Station 9	Water rinse, tap	Continuously flowing at 2-3 gpm	1 minute	Mechanical bar or horizontal spray	Ambient	None	None	N/A
Station 10	Rinse Aid	RINSE/Aid AH-1 2-5% v/v	2 min	Mechanical bar or horizontal spray	120°F	Steel, Quartz, or Teflon	None	None
Station 11	Water rinse, tap	Continuously flowing at 2-3 gpm	1 minute	Mechanical bar or horizontal spray	Ambient	None	None	N/A
Station 12	Forced air dry	None	5 minutes	N/A	N/A	N/A	N/A	N/A

Control and Replenishment

The bath volume of E-TIN 34 PRE-DIP should be replaced with fresh additions of E-TIN 34 PRE-DIP. The bath should be dumped after processing approximately 350 – 400 surface square feet per gallon of bath (assuming 10% exposed copper area on each panel). The bath volume of E-TIN 34 should be maintained with additions of deionized or distilled water. The E-TIN 34 bath is replenished with stannous fluoborate and E-TIN 34, based upon the tin concentration as determined by the procedure below. The bath should be replaced when the time to initiate tin plating exceeds 30 seconds.

E-TIN 34 PRE-DIP

The bath volume of E-TIN 34 PRE-DIP should be replaced with fresh additions of E-TIN 34 PRE-DIP or DEIONIZED WATER based upon the total acidity of the bath. The bath should be dumped after processing approximately 350 – 400 surface square feet per gallon of bath (assuming 10% exposed copper area on each panel).

Determination of Acidity of E-TIN 34 PRE-DIP

Reagents Required	Equipment Required
Sodium Hydroxide 1.0 N Standardized	Buret, 50 ml
Thymolphthalein 0.05 – 0.2% Solution	Erlenmeyer Flask, 250 ml
	Pipet, 5 ml

Procedure

1. Pipet 5 ml of sample into the Erlenmeyer flask and add about 50 ml of deionized water.
2. Add approximately 2 ml of Thymolphthalein solution and mix.
3. Titrate with Sodium Hydroxide through light blue to a stable deep blue. Record the volume as A.
4. Determine the acid normality using the calculation below.

Calculation

$$\frac{A \times B}{C} = \text{acid normality (N)}$$

Where A = ml of sodium hydroxide required
B = N of sodium hydroxide (1.0)
C = sample volume in ml (5)

Additions

The normal operating range for total acidity in E-TIN 34 PRE-DIP is 1.2 – 1.9 N. The acid normality will fluctuate due to use and water evaporation.

IF THE ACID NORMALITY IS LOW

If the normality is less than 1.6, add E-TIN 34 PRE-DIP to maintain the level until the acid normality is greater than 1.6.

IF THE ACID NORMALITY IS HIGH

If the acid normality is greater than 1.6, add deionized water to maintain the level until the acid normality is less than 1.6.

E-TIN 34

The bath volume of E-TIN 34 should be maintained with additions of deionized or distilled water. The E-TIN 34 bath is replenished with stannous fluoborate and E-TIN 34, based upon the tin concentration as determined by the procedure below. The bath should be replaced when the time to initiate tin plating exceeds 30 seconds.

Determination of Tin in E-TIN 34

Reagents Required	Equipment Required
Acetate Buffer[1]	Buret 50 ml
Edta Standardized 0.10 M	Erlenmeyer Flask 250 ml
Methyl Thymol Blue Indicator	Pipet 5 ml

[1]60 ml of glacial acetic acid is added to 500 ml of deionized water. Add 160 g of sodium acetate and mix until dissolved. Dilute to 1000 ml with deionized water.

Procedure

1. Pipette 5 ml of working bath into a 250 ml Erlenmeyer flask containing 50 ml of deionized water. Add 25 ml of acetate buffer and mix.
2. Add 15 drops of indicator and titrate with standardized EDTA to a yellow endpoint. Record the number of mls of EDTA required.

Calculation

$$\frac{A \times B \times C}{D} = \text{g/L of tin metal}$$

Where
- A = ml of EDTA required to reach endpoint
- B = M of EDTA (0.10)
- C = M.W. of tin (118.7)
- D = sample volume in ml (5)

Additions

To increase the tin concentration use the calculation below:

$$\frac{(30 - E) \times F \times 1000}{325} = \text{ml of stannous fluoborate, 50\% to add}$$

Where
- E = g/L of tin measured above
- F = volume of the bath in liters

In addition to stannous fluoborate 50%, a corresponding volume of E-TIN 34 must also be added using the calculation below.

Corresponding volume of E-TIN 34 to add:

$$\frac{(G \times 0.008) \times F}{325} = \text{liters of E-TIN 34 to add}$$

Where G = mls of stannous fluoborate, 50% added
F = bath volume in liters

Determination of Total Acidity in E-TIN 34

Reagents Required	Equipment Required
Sodium Hydroxide 1.0 N Standardized	Buret, 50 ml
Thymolphthalein 0.05 – 0.2% Solution	Erlenmeyer Flask, 250 ml
	Pipet, 5 ml

Procedure

1. Pipet 5 ml of sample into the Erlenmeyer flask and add about 50 ml of deionized water.
2. Add approximately 2 ml of Thymolphthalein solution and mix.
3. Titrate with Sodium Hydroxide through light blue to a stable deep blue. Record the volume as A.
4. Determine the acid normality using the calculation below.

Calculation

$$\frac{A \times B}{C} = \text{acid normality (N)}$$

Where A = ml of sodium hydroxide required
B = N of sodium hydroxide (1.0)
C = sample volume in ml (5)

Additions

The normal operating range for total acidity in E-TIN 34 is 1.97 – 2.99 N. The acid normality will fluctuate due to use and water evaporation.

IF THE ACID NORMALITY IS LOW

If the normality is less than 1.97, add E-TIN 34 to maintain the level until the acid normality is greater than 2.5.

IF THE ACID NORMALITY IS HIGH

If the acid normality is greater than 2.99, add deionized water to maintain the level until the acid normality is less than 2.5.

Safety and Handling

Read and understand this products MSDS before handling.

Waste Treatment

Individual users should verify the nature of spent solutions to assure compliance with local, state, and federal regulations. Contact Seacole for specific details and/or further waste treatment recommendations.

Ordering Information

E-TIN 34 is packaged in 5 gallon pails and 55 gallon drums.

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