

# TECHNIETCH 1118

PRODUCT DATA SHEET  
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## PRODUCT DESCRIPTION

**TechniEtch 1118** is a proprietary ammonia-free, persulfate microetch designed to provide improved topography over standard persulfate and peroxide chemistry at the same etch depth.

This topography will improve resist or plating adhesion which becomes critical when processing parts with fine features.

The microetch is effective for both electroless and electroplated copper surface treatment and will provide additional cleaning and some tarnish resistance.

TechniEtch 1118 can be used in horizontal or vertical equipment and for various applications including surface treatment prior to resist, electrolytic and electroless copper plating, electroless nickel as well as many copper surfaces commonly used in connector and lead frame manufacturing processes.

## MAIN FEATURES

- ✚ High copper solubility levels.
- ✚ Ammonia free.
- ✚ Stable chemistry.
- ✚ Cost effective replacement for generic persulfate and peroxide microetch.
- ✚ Good copper topography with consistent etch rates.
- ✚ A stable etching rate with uniform copper etching.
- ✚ Environmentally friendly with simple waste treatment.
- ✚ Compatible with subsequent electrolytic end electroless processes.

## PHYSICAL PROPERTIES

TechniEtch 1118 Make-Up	Salt
TechniEtch 1118 Additive	Liquid

Equipment	Material
Tank	PVC, PP, PE
Heater	Quartz or Teflon coated
<b><u>Note: Stainless steel is not recommended</u></b>	
Chiller	PVC

Filtration: Continuous solution filtration using leached 1–5µm woven polypropylene cartridges with a flow rate of three – five times the tank volume/hour is recommended.

### **EQUIPMENT PREPARATION**

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

This procedure is very important for new equipment and equipment previously used for other processes.

#### **Leaching solutions:**

Sulphuric acid (d =1,84) 100ml/l, (10% v/v)

#### **Leaching procedures:**

1. Thoroughly wash down the tank and ancillary equipment with clean water.
2. Recirculate the water through the complete system to remove water soluble material.
3. Discard the water.
4. Add the leaching solutions and recirculate through the complete system.
5. Leave the leaching solution in the tank for a minimum of 8 hours.
6. Recirculate the leaching solution through the complete system.
7. Discard the leaching solution.
8. Recirculate the water through the complete system.
9. Discard the water.

#### **Cartridges Filtration:**

1. Wash with hot water at 60°C.
2. Recirculate with solution at 100ml/m of sulphuric acid (d=1.84).
3. Thoroughly wash with water.

## SOLUTION MAKE-UP

Preparation of 1 litre of solution for base copper or/and galvanic copper etching

Product	Amount
TechniEtch 1118 Make-Up	60g/l
TechniEtch 1118 Additive	60ml/l
DI water	Until volume

Preparation of 1 litre of solution for electroless copper etching

Product	Amount
TechniEtch 1118 Make-Up	20g/l
TechniEtch 1118 Additive	20ml/l
DI water	Until volume

### MAKE-UP PROCEDURE

1. Fill tank 2/3 full with DI water.
1. Slowly dissolve the TechniEtch 1118 Make-Up.
2. Allow solution to come to operating temperature.
3. Slowly add TechniEtch 118 Additive and mix thoroughly.
4. Dilute to final volume with DI water.
5. Analyze and adjust the TechniEtch 1118 Make-Up.
2. Adjust operating temperature.

## OPERATING PARAMETERS

### Base copper and galvanic copper etching

Parameters	Range	Optimum
TechniEtch 1118 Make-Up	50 – 70g/l	60g/l
TechniEtch 1118 Additive	50 – 70ml/l	60ml/l
Contact time	30sec – 5min	Dependent on Application
Copper removal	0.5 - 1.1µm/min	Dependent on Application
Temperature	28 – 32°C	30°C

### Electroless copper etching

Parameters	Range	Optimum
TechniEtch 1118 Make-Up	18 – 24g/l	20g/l
TechniEtch 1118 Additive	18 – 24ml/l	20ml/l
Contact time	30sec – 5min	Dependent on Application
Copper removal	0.2–0.5µm/min	Dependent on Application
Temperature	28 – 32°C	30°C

## COMPONENT DESCRIPTIONS

TechniEtch 1118 Make-Up functions as the primary source for the oxidizer and the concentration must be maintained for the effective operation of the TechniEtch 1118 process.

Typical solution life is 45g/l of dissolved copper, but the process can be operated up to 50g/l, depending on equipment and operation.

Technietch 1118 Additive contains proprietary materials that extend bath life, improve surface topography and provide some antitarnish capability.

## RECOMMENDED REPLENISHMENT AND CONTROL SCHEDULE

Component	Analytical Method	Frequency of analysis	Estimate Replenishment Rate
<b>Etch rate</b>	Weight-etch-weight	Daily	Maintain etch rate at recommended rates, depending on application
<b>TechniEtch 1118 Make-Up</b>	Titration	Daily	Based on analysis
<b>TechniEtch 1118 Additive</b>	N/A	Daily	Add 100ml for every Kg of TechniEtch 1118 Make-Up
<b>Copper Loading</b>	Atomic Absorption Spectroscopy	Weekly	Replace once 45g/l is achieved in solution

### SOLUTION MAINTENANCE

TechniEtch 1118 Make-Up is typically replenished based on analysis to maintain the concentration within the range for a specific operation.

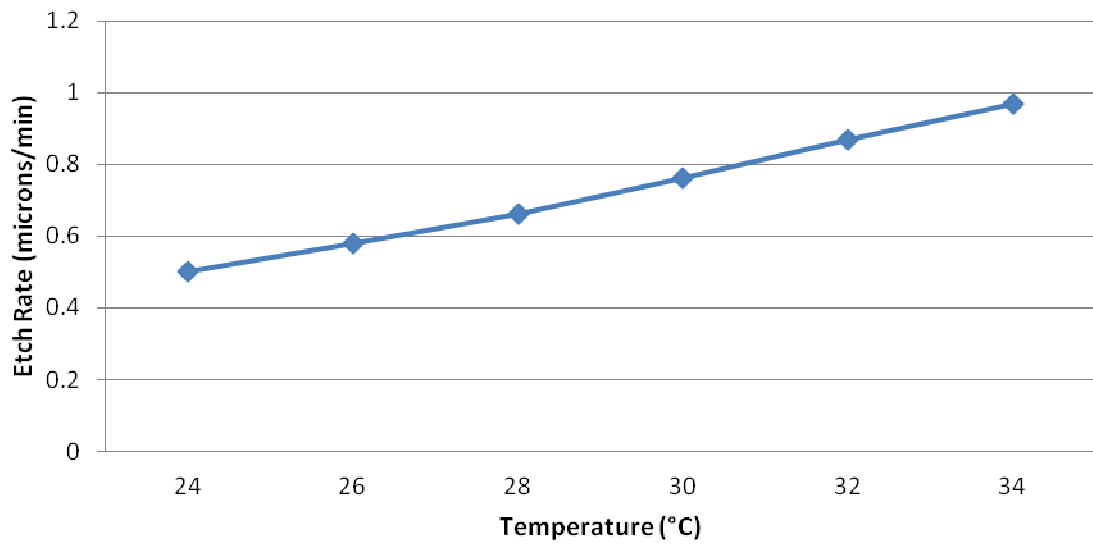
For high volume application feed-and-bleed system can be utilized to extend the dump schedule.

TechniEtch 1118 Additive is consumed by drag-out and is replenished based on consumption of TechniEtch 1118 Make-Up at the rate of 100ml of TechniEtch 1118 Additive for every 1Kg of TechniEtch 1118 Make-Up.

Copper level should be checked on a periodic bases and the solution should be discarded when the copper reaches 45g/l.

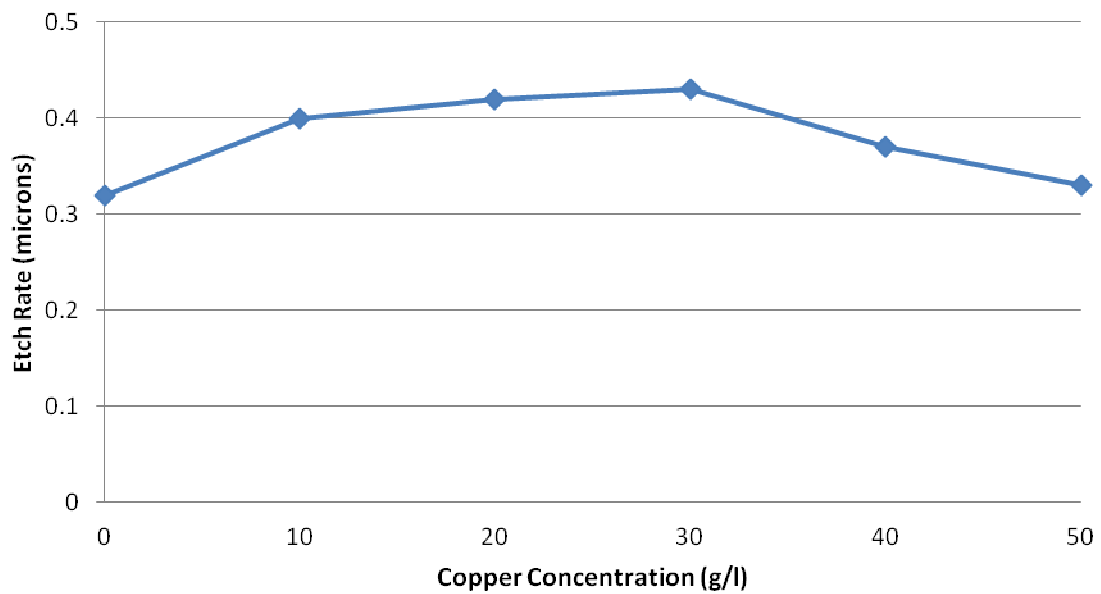
## Etch Rate Vs. Temperature

TechniEtch 1118 60g/l 40sec 30°C  
At production Installation In Horizontal Equipment



## Etch Rate Vs. Copper Concentration

TechniEtch 1118 60g/l 40sec 30°C  
At production Installation In Horizontal Equipment



## ANALYTICAL CONTROL METHODS

### Etch Rate Determination

The copper etch rate of TechniEtch 1118 working solution is measured as follows:

1. Cut, clean copper clad coupon 28 x 20cm
2. Weight a previously coupon on an analytical balance, record this weight as **W1**
3. Process the coupon in the production line, rinse and dry
4. Re-weight the coupon
5. Records this weight as **W2**

Calculation:

$W1 - W2 = \text{Etch rate in micron}$

### Determination of TechniEtch 1118 Make-Up

#### Equipment

- Pipette
- 50ml burette
- 250ml Erlenmeyer flask
- 50ml Graduated Cylinder

#### Reagents

- Sodium Thiosulphate Solutions 0.1N
- H<sub>2</sub>SO<sub>4</sub> 50% (41Bè)
- KI salt
- Starch Paste Indicator

#### Procedure

1. Pipette 5.0ml of TechniEtch 1118 working solution into a 250ml Erlenmeyer flask.
2. Add 50ml of DI water.
3. Add 6ml of H<sub>2</sub>SO<sub>4</sub> 50% (41Bè).
4. Add 5g of KI.
5. Agitate 1 minute and wait 30minute for reaction.
6. Titrate with Sodium Thiosulphate 0.1N until the solution became yellowish.
7. Add 3ml of Starch Paste Indicator and titrate to a colourless endpoint.

## Calculation

Concentration TechniEtch 1118 Make-Up (g/l) = (mls of Sodium Thiosulphate 0.1N – mls of EDTA for copper calculation) \* 3.084

Maintain TechniEtch 1118 Make-Up concentration at 60g/l

## **Determination of copper in TechniEtch 1118 Solution**

### Equipment

- Pipette
- 50ml burette
- 250ml Erlenmeyer flask
- 50ml Graduated Cylinder

### Reagents

- EDTA Solutions 0.1M
- Buffer Solutions (50ml/l Ammonium Hydroxide, 38g/l Ammonium Chloride in D.I. water)
- PAN indicator solution 0.1%

### Procedure

8. Pipette 1.0ml of Technietch 1118 working solution into a 250ml Erlenmeyer flask.
9. Add 50ml of buffer solution (solutions turns blue)
10. Add 10 drops of PAN Indicator solution (solution turn violet)
11. Titrate with EDTA 0.1M to a light green to pale yellow endpoint

### Calculation

Concentration of copper (g/l) = mls of EDTA 0.1M \* 6.354



## TROUBLESHOOTING INFORMATION

Defect	Cause	Correction
<b>Fingerprints</b>	Improper etch	Increase contact time
		Increase concentration of TechniEtch 1118
<b>Copper Oxidation</b>	Insufficient dwell time	Increase dwell time in solution
	Improper etch	Increase concentration or temperature of TechniEtch 1118
<b>Salt Formation on Surface</b>	Copper content greater than or equal to 50g/l	Discard solution and re-make a new one

### METALLIC IMPURITIES

The maximum tolerable level of metallic contaminants is listed below:

Ni: 1000ppm

Sn: 100ppm

Fe: 1000ppm

### **STORAGE**

Only store Technietch 1118 in original containers, upright, away from direct sunlight and in a dry area at 10-32°C. Keep container closed when not in use and, keep away from organics, reducing agents, strong alkalis and oxidizers.

## **HANDLING PRECAUTIONS**

Technietch 1118Make-Up, Additive and its working solutions are highly acidic and require the normal precautions for the handling of strong acids.

Avoid contact with skin and eyes, handle with care, wear chemical goggles, chemical gloves and suitable protective clothing when handling.

In case of contact, flush affected area with copious amounts of cold, clean water for at least 10 minutes.

In case of serious exposure, particularly for eyes, obtain medical attention for acid burn.

**READ MATERIAL SAFETY DATA SHEET PRIOR TO HANDLING THIS PRODUCT**

## **WASTE TREATMENT**

It is the user's responsibility to verify that treatment procedures comply with local regulations.

Working solutions should be diluted, neutralized and disposed of in accordance with local regulations.

**In case of order please indicate this code:**

Product Name	Salt	Liquid	Product Code
<b>Technietch 1118 RTU</b>		<b>X</b>	<b>GC7400</b>
<b>Technietch 1118 Make Up</b>	<b>X</b>		<b>GC7401</b>
<b>Technietch 1118 Additive</b>		<b>X</b>	<b>GC7402</b>

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