



Product Bulletin

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HUB-ETCH BLT **(Better Line Thickness)**

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HUBETCH BLT is an alkaline etchant designed for line applications where maximum line width retention is required. **HUBETCH BLT** achieves minimal lateral undercut while maintaining a consistent etching rate when operated within the standard parameters given below.

Following processing in **HUBETCH BLT**, neutralization of the tin lead surface can be achieved by use of H-H Sunbrite 38P or Sunbrite 44 solder cleaning solutions.

Resist compatibility with **HUBETCH BLT**

- Tin Lead Solder
- Bright Solder
- Tin
- Bright Tin
- Nickel
- Nickel Gold
- Gold
- Most dry films

Some alkaline strippable screen resists may be removed or softened in alkaline etchants. However, the low operating pH of **HUBETCH BLT** increases the ability of these resists to withstand this tendency to soften or be removed.

OPERATING PARAMETERS

Solution make-up:	HUBETCH BLT starter solution – full strength
Solution Maintenance:	HUBETCH BLT replenisher – full strength
Operating Temperature:	120-130F 125F optimum (52°C)
Operating pH:	7.5 – 8.0
Operating Baume' at 125F:	17 -- 18 Be'
Copper Concentration:	10 --15
Ventilation:	Lip vent preferred

EQUIPMENT REQUIRED

The **HUBETCH BLT** alkaline etchant system is designed for use in conveyORIZED spray etching equipment having thermostatic temperature controls and proper ventilation. The venting system must be capable of creating a slight negative pressure in order to confine ammonia fumes to the etch chamber. The use of a de-minister and a damper valve in the vent stack is recommended to prevent excessive loss of ammonia.

If the alkaline spray etcher is equipped with a recirculating spray rinse or a multiple cascade rinse after the etch chamber, there should not be a vent stack or high volume air knife adjacent to this rinse. The elimination of this vent stack at the recirculating rinse is to prevent ammonia loss, which could cause a pH below 8.0 in the main sump. When venting is properly controlled in the entrance controlled in the entrance area pH the etcher; it is possible to main sump. When venting is properly controlled in the entrance area of the etcher, it is possible to maintain proper operating levels of all components. The function of the replenisher rinse is to minimize the copper salts on

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the circuit area and also reduce the copper concentration of drag-out to the drain. There must be a water rinse after the replenisher rinse and before the use of the Sunbrite 38P or Sunbrite 44 solutions.

Etching equipment should be made of PVC or equivalent material. All metal in direct contact with the etchant solution should be made of titanium, including roller bars, heating and cooling coils.

Quartz immersion heaters may also be used. Do not use stainless steel in contact with either the **HUBETCH BLT** replenisher or starter solutions.

PERIODIC MAINTENANCE

1. Periodically pump etcher sump into a clean drum and rinse etch chamber with tap water.
2. Fills etch chamber with water and add 5 gallons of technical grade hydrochloric acid.
3. Turn sprays on and allow this solution to spray for 10 to 15 minutes. Check the spray nozzle for blockage, clean if necessary, clean filter screens and replace. Clean out high-pressure lines to gauges and hydrometer stack.
4. Drain pump and rinse with tap water.
5. Repeat as required
6. Replace with **HUBETCH BLT** starter solution.

OPERATING INSTRUCTIONS

START-UP

1. Charge etcher with **HUBETCH BLT** starter solution.
2. Turn etcher heaters on. Do not turn the etcher sprays on.
3. When the etcher sump reaches operating temperature, turn on the sprays.
4. Turn on power to the control module, and set module switch to automatic.
5. Check the Baume' at 125F (52°C) if it is in the operating range, you are now ready to etch boards.
6. Turn on exhaust fan and open damper valve in the vent stacks just enough to prevent ammonia fumes from entering the adjacent work area. Do not over-ventilate. Excessive loss of ammonia will cause the pH of the etching solution to drop below 8.0 with a resultant decrease in etch rate.

CONTINUOUS OPERATION

1. Set conveyor speed control for the thickness of copper being etched.
2. Continue processing panels.
3. Periodically check:
 - A. The replenisher source to prevent it from going dry.
 - B. The spent storage drum to prevent overflow and spillage.
 - C. The specific gravity at operating temperature.

TEMPORARY SHUTDOWN

1. Turn off etcher spray pumps when boards are not being etched.
2. Switch control module to "off"

OVERNIGHT SHUTDOWN

1. Turn off etcher spray pumps
2. Turn off **HUBETCH BLT** control module
3. Turn off heaters

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DAILY MAINTENANCE

1. Check specific gravity and copper concentration. Samples to check for specific gravity and/or copper can be obtained by inserting a clear plastic tube into the module overflow pipe, which is located at the right side of the unit.
2. Check pH (8.0 to 8.3 at 125F). During installation of the **HUBETCH BLT**, the operating pH will stabilize and should remain somewhat constant. However, changes in venting can dramatically change the pH. The pH should be checked daily. If fluctuations are noted showing a lower pH value than normal, contact your Hubbard-Hall service engineer to troubleshoot the process. When checking the pH of the solution, it is very important that the pH meter and electrodes be accurate and standardized before use. Buffer the pH meter with a pH 7.0 buffer and crosscheck with a pH 10.0 buffer.

ANALYTICAL CONTROL FOR COPPER

EQUIPMENT AND REAGENTS

1.0 ml pipette
250 ml Erlenmeyer Flask
Glacial Acetic Acid
Potassium Iodide
Starch Solution
0.1 N sodium thiosulfate standard solution

PROCEDURE

1. Pipette 1.0 ml of **HUBETCH BLT** into a 250 ml Erlenmeyer flask and dilute to 100 ml with deionized water.
2. Add 5 ml of glacial acetic acid.
3. Add 2 gm of potassium iodide.
4. Titrate with 0.1 N sodium thiosulfate to a light straw yellow color. Add 5 ml of starch solution. The solution will turn blue-black.
5. Titrate further to a near-white endpoint.

CALCULATIONS

$$\text{MLS X 0.8513} = \text{OZ/GAL OF COPPER}$$

Alternate Control Procedure:

Equipment and Reagents:

100 ml volumetric flask	DI water
10 ml pipette	Pan indicator
25 ml graduated cylinder	0.0575 M EDTA
5 ml pipette	Ammonium hydroxide
250 ml Erlenmeyer flask	Methanol
50 ml graduated cylinder	

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Determination of copper in Hubetch:

1. Pipette a 10-ml sample of Hubetch BLT into a 100-ml volumetric flask. Fill to the line with DI water, stopper and shake.
2. Pipette a 5-ml aliquot into a 250-ml Erlenmeyer flask.
3. Add 50 ml of DI water.
4. Add 15 ml of ammonium hydroxide.
5. Add 50 ml of methanol
6. Add 8 – 10 drops of pan indicator.
7. Titrate with 0.0575 M EDTA to a blue-green endpoint.

Calculations:

- A. (mls of EDTA) x (0.0575) x (127) = Cu in grams per liter
- B. (mls of EDTA) x (0.0575) x (16.96) = Cu in ounces per gallon

CAUTION

Adequate ventilation must be provided on the etching equipment in which **HUBETCH BLT** starter and replenisher solutions are used. A strong ammonia odor is released when either of the solutions are agitated. General room ventilation is also recommended. Avoid contact of the **HUBETCH BLT** starter, replenisher, Sunbrite 33 or Sunbrite 44 solutions with eyes and skin. Safety goggles and protective clothing should be worn when handling the products. If contact should occur, apply copious amounts of cold water to the affected area and get medical attention. Any spillage of these materials should be washed with large amounts of water.

PACKAGING AND STORAGE

HUBETCH BLT starter and replenisher solutions are available in 55 gallons drums. **HUBETCH BLT** replenisher solution is also available in bulk tank wagon shipments. These chemical

products can be stored over extended periods of time in their original drums if placed in a protected area with a temperature range between 55-90F.

WARRANTY

The quality of this product is guaranteed on shipment from our plant. If the use recommendations are followed, desired results will be obtained. Since the use of our products is beyond our control, no guarantee expressed or implied is made as to the effects of such use, or the results to be obtained.