Seacole Specialty Chemical

Technical Data Sheet

AUTO / Prep HS-110S

Dielectric and Drill Smear Conditioner

Product Description

AUTO/Prep HS-110S is the first step in the AUTO/Prep desmear-etchback process designed to remove resin smear, expose interconnects, and at the same time optimize the surface topography of the dielectric for eventual electroless copper deposition. AUTO/Prep HS-110S "softens" the dielectric, enhancing the uniformity and topography of permanganate desmear-etchback. AUTO/Prep HS-110S features process flexibility, long solution life, ease of operation, and is recyclable.

Performance Features

- AUTO/Prep HS-110S can be operated at 50-100% by volume depending upon the desired rate and depth of desmear and/or etchback offering flexibility and economy.
- AUTO/Prep HS-110S is safe, non toxic, biodegradable, pH neutral, and recyclable when spent.
- AUTO/Prep HS-110S offers long solution life and minimal operator maintenance for ease of use.
- AUTO/Prep HS-110S will yield excellent hole wall topography when used in conjunction with AUTO/Prep DS-2, improving electroless copper deposition and adhesion on most dielectrics.
- AUTO/Prep HS-110S exhibits very low surface tension, ensuring small hole wetting and penetration, thus enhancing the permanganate desmear-etchback process.
- AUTO/Prep HS-110S is suitable for use with most dielectrics.

Physical Specifications

Physical State	Liquid
Appearance	Clear
Odor	Mild Amine
Stability	Stable
Specific Gravity	1.03
Flash Point	200ºF
Storage Requirements	None

Equipment Requirements

Tanks: Molded Polypropylene, Steel, Or Titanium. PVC Is Not Compatible With Auto/Prep HS-110S.
Heaters: Quartz, Titanium, Stainless Steel, Or Teflon.
Racks: Stainless Steel Or Titanium.
Filtration: Chemically Impervious Recirculation Pump With Filter Will Enhance Treatment Process.
Agitation: Mechanical Bar Recommended. Air Agitation Not Recommended Because Of Fuming.
Ventilation: Required

Product Make-Up

AUTO/Prep HS-110S can be used full strength or diluted up to 50% of water. If diluting, follow the procedure below.

1. Thoroughly rinse the tank and inspect for cleanliness paying special attention to the heaters and heater sheathings.
2. Fill the tank half full with deionized water. Add AUTO/Prep HS-110S concentrate such that after final dilution the concentration is 50%.
3. Turn on heaters and verify temperature with a thermometer.

NOTE: For optimum performance when diluting AUTO/Prep HS-110S, use only distilled or deionized water. If etchback and three point interconnect is desired, AUTO/Prep HS-110S should be used full-strength.

Operating Parameters

A typical etchback-desmear process line employing the AUTO/Prep process is as follows:

Process	Immersion Time (Minutes)	Temperature (ºF)	Agitation
HS110-S[1]	5-15	100-140	Solution
Water Rinse	1-2	Ambient	Air
Water Rinse	1-2	Ambient	Air
DS-2 - 55g/L	15-30	150-180	Solution
Water Rinse	1-2	Ambient	Air
Water Rinse	1-2	Ambient	Air
NU-3 50g/L	4-8	70-130	Solution
Water Rinse	3-5	Ambient	Air
GE-4 - 50g/L[2]	2-4	70-90	Solution
Water Rinse	1-2	Ambient	Solution
Sulfuric Acid Dip 10%	2-5	Ambient	Solution

Perform a final rinse prior to electroless processing.

NOTE 1. When using HS-110S at full strength, you should not exceed process times of 15 minutes. General rule of thumb is 5 minutes immersion when operating HS-110S at full strength and 10 minutes when at 50%.

NOTE 2. AUTO/Prep GE-4 can be incorporated directly into the NU-3 bath thus reducing the number of steps in the process line.

Due to the many dielectrics employed and variance in processing, parameters must be optimized for each type of resin and the desired rate of etchback and/or desmear. It is not uncommon for resin etch rates to vary from vendor to vendor and even lot to lot. It is advisable to periodically observe the topography of the sidewall via SEM photography and measure the etch rate in the permanganate of random samples to ensure proper processing.

Determination of Auto/Prep HS-110S Concentration

Equipment Required	Reagents Required
Beaker, 250 ml	Sodium Hydroxide Pellets
Graduated Cylinder, 100 ml	

Procedure

1. With a graduated cylinder, measure 100 ml of working bath and transfer into a clean, dry 250 ml beaker. Add 10 grams of sodium hydroxide and stir until the sodium hydroxide is dissolved.
2. Transfer the contents of the beaker into a 100 ml graduated cylinder and allow the solution to separate. Measure the volume of solution in the upper layer and record.

Calculations

$$\frac{A \times 100}{B} = \%\text{ by volume HS-110S}$$

Where A = ml of solution in the upper layer
B = sample volume

Additions of HS-110S concentrate should be made directly as a percent by volume addition to maintain the concentration within the range desired. Replace drag-out with additions of HS-110S and water. It is advisable to replace the solution after approximately 3,000 square feet have been processed.

Determination Of Weight Loss During Desmear-Etchback

Equipment Required	Reagents Required
None	None

Procedure

1. Thoroughly clean and dry a laminate coupon of known surface area and measure the weight. Record the weight as A. The weight should be measured to the nearest 0.0001 g and the surface area to the nearest 0.01 cm.
2. Process the coupon through the hole conditioner and permanganate lines. Ensure you know the exact concentrations of the HS-110S and the permanganate, and have recorded the process times and temperatures.
3. After the coupon has been processed, thoroughly rinse and dry the sample. Measure the weight after etching and record as B.

Calculations

$$\frac{(A - B) \times 400}{C \times D} = \text{mls of etchback}$$

Where A = weight before etching in grams
B = weight after etching in grams
C = density of resin in g/cm³
D = surface area of coupon in cm²

Record the weight loss of the coupon and visually examine the topography and interconnect exposure of work processed at the time the coupon was processed. Record the observations and vary process parameters if necessary. If processed work is acceptable, the consistency of future work can be maintained by periodically measuring the etch rate.

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
AUTO/Prep HS-110S is available in 5 gallon pails and 55 gallon drums.

13505 Industrial Park Blvd. Plymouth, MN 55441