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Product Data Sheet

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PRODUCT #: N8051 & N8063

LAYERBOND 2000

Multilayer Adhesion Promoter

DESCRIPTION: An adhesion promoter for inner layer bonding. ***LAYERBOND 2000*** produces a unique surface topography that promotes bonding of dielectric and copper.

BENEFITS:

- **Good bond strength, no delamination**
- **High acid resistance eliminates pink ring**
- **Simplified process for increased productivity**

EQUIPMENT: Equipment should be constructed of polypropylene or CPVC. Heaters should be constructed of Teflon® or Quartz. Ventilation is required.

INNER LAYER PROCESS: ***PREPBOND*** alkaline cleaner → Double counterflow rinse → ***LAYERBOND 2000*** → Flowing water rinse → Dry

MAKE-UP/ OPERATING INSTRUCTIONS:

LAYERBOND 2000	**Spray/Flood**	**Soak**
LAYERBOND 2000 concentrate:	95 – 96%	95 - 96%
Hydrogen Peroxide (50%):	4 – 5% (of 50%)	4 - 5% (of 50%)
Temperature:	85°F (80° - 90°F)	85°F (80° - 90°F)
Dwell Time:	60 – 90 seconds	2 - 3 minutes

Procedure:

1. Add the required amount of ***LAYERBOND 2000*** .
2. Add the required amount of **Hydrogen Peroxide (50%)** and mix well.

LAYERBOND 2000 can be used in low pressure spray and flood equipment, or in soak application. For spray/flood applications, filtration through a 50-micron filter is recommended.

Pre-clean panels in an alkaline cleaner. Do not use a microetch solution immediately preceding the ***LAYERBOND 2000*** If it is necessary to have a microetch in the process, it should be done prior to the alkaline cleaner.

LAYERBOND 2000 can process 80 – 90 square feet per gallon of working solution. Replenish by adding 200 ml of ***LAYERBOND REPLENISHER*** for every 30-40 square feet of copper surface (13 layers 18" X 24", 50% circuitry) processed.

Analyze ***LAYERBOND 2000*** working solution for concentration, hydrogen peroxide and copper level once per shift, adjust if necessary. Check copper etch rate after each analysis for hydrogen peroxide. If copper concentration exceeds 20 g/l, decant 50% of the bath and replenish with fresh make-up.

CONTROL PARAMETERS:

To achieve optimum results, the bath should be maintained at the following concentration

LAYERBOND 2000	**OPTIMUM**	**RANGE**
LAYERBOND 2000 **Concentration:**	90%	85-95%

NOTE: Results may vary based on individual process requirements.

ANALYSIS & REPLENISHMENT:

ANALYSIS PROCEDURE FOR *LAYERBOND 2000* PROCESS

Determination of concentration of *PREPBOND*

Equipment: 10 ml pipette, 250 ml Erlenmeyer flask or Beaker, 50 ml burette, pH meter

Reagents: 1.0N Hydrochloric Acid (HCl) – Commercially available from chemical supplier.

Methyl Orange Indicator Solution - Dissolve 100 mg of methyl orange in distilled water and dilute to 100 ml.

Procedure:

1. Pipette a 10 ml sample of the working bath into a 250 ml Erlenmeyer flask or beaker.
2. Add 100 ml D.I. water, and mix.
3. Add approximately 7 drops of methyl orange indicator solution.
4. Titrate with 1.0N hydrochloric acid until the color changes from yellow to orange. Record number of mls.

OR

Titrate with 1.0N hydrochloric acid, using a pH meter, to a pH end point of 3.8. Record number of mls.

Calculation: Mls of HCl x N of HCl = Percent ***PREPBOND*** by volume

Determination of concentration of *LAYERBOND 2000*

New Bath Make-up

Equipment: 5 ml pipette, 200 ml Beaker, 50 ml burette, pH meter

Reagents: 1.0N Sodium Hydroxide (NaOH) - Commercially available from chemical supplier.

Procedure:

1. Pipette a 5 ml sample of the working bath into a 200 ml Beaker.
2. Add 100 ml D.I. water, and mix.
3. Add 5-7 drops of phenolphthalein indicator solution.
4. Titrate with 1.0N sodium hydroxide solution, using a pH meter, to a pH end point of 8.5. Record number of mls.

Calculation: Mls of 1.0N NaOH x 5.38 = % by volume ***LAYERBOND 2000***

Determination of concentration of Hydrogen Peroxide

Equipment: 1 ml pipette 500 ml Erlenmeyer Flask
50 ml burette

Reagents: 50% Sulfuric Acid solution - carefully dilute reagent sulfuric acid 50% by volume by adding to distilled water.

Ferroin Indicator - mix 1.285 grams 1, 10-Phenanthroline with 0.695 grams ferrous sulfate heptahydrate, and dissolve in 100 ml of distilled water.

0.1N Standard Ceric Ammonium Sulfate solution - purchase standardized solution from laboratory chemical supplier.

Procedure:

1. Pipette a 1 ml sample of the working bath into a 500 ml Erlenmeyer flask and add 200 ml D.I. water, and mix.
2. Add 20 ml of 50% sulfuric acid solution, and mix.
3. Add 6-8 drops of Ferroin indicator solution.
4. Titrate with Standard 0.1N Cerric Ammonium Sulfate solution from orange-red to a pale blue end point. Record number of mls.

Calculation: Mls of Standard 0.1N Cerric Ammonium Sulfate x 0.271 = Percent by volume of 50% Peroxide

Determination of concentration of Copper

Equipment: 1 ml pipette 500 ml Erlenmeyer Flask or beaker
50 ml burette

Reagents: Ammonium Hydroxide, Concentrated

0.05 M EDTA - Commercially available from chemical supplier.

PAN Indicator - Dissolve 0.1 g of 1-(2-Pyridylazo)-2-Napthol in 100 ml of methanol

Procedure:

1. Pipette a 1 ml sample of the working bath into a 500 ml Erlenmeyer flask or beaker.
2. Add 10-15 ml of concentrated ammonium hydroxide. Solution will turn blue.
3. Dilute to 200 ml with D.I. water. Let stand for 5 minutes to complete the reaction.
4. Add 5-10 drops of PAN indicator solution.
5. Titrate with 0.05M EDTA solution from a light purple to a clear yellow end point. Record number of mls.

Calculation: Mls of 0.05M EDTA x 3 = g/l copper

* Copper may also be analyzed by standard atomic absorption method.

Copper etch rate determination

Equipment: Analytical Balance Copper clad coupon 3"x 3" or 4"x 4"

Procedure:

1. Clean the copper coupon, dry completely and weigh on analytical balance to 0.1 mg. Record weight.
2. Attach coupon to leader panel and process through the spray chamber or immerse in solution. Record time in minutes.
3. Rinse coupon well with water, and dry completely.
4. Re-weigh coupon, and subtract weight in step 4 from weight in step 1 to obtain weight lost in grams.

Calculation: $\frac{\text{Weight lost in grams}}{(\text{area sq. in.})(\text{minutes})} \times 6826 = \text{Etch rate (microinches per minute)}$

CAUTIONS: ***LAYERBOND 2000*** is an acidic oxidizing solution, ***LAYERBOND REPLENISHER*** is slightly acidic, and ***PREPBOND*** is alkaline. Avoid contact with skin and eyes. Wear goggles and gloves when handling these products. In case of contact with eyes, flush immediately with water for at least 15 minutes and obtain medical attention. In case of contact with skin, rinse immediately with water, and wash with soap and water. Refer to Material Safety Data Sheets for further information.

Do not use or store ***LAYERBOND 2000*** in metal containers. Do not exceed 200 ppm of iron in the working solution.

DISPOSAL: ***LAYERBOND 2000*** is an acidic oxidizing solution. Neutralize spent solutions to pH 8 to precipitate copper (as copper hydroxide). Dispose of supernatant liquid and precipitated metal in accordance with all local, state and federal regulations.