

Primary Imaging

LAMINAR GA

LAMINAR GA Dry film Photopolymer is an aqueous processable dry film photoresist designed for alkaline etch and acid plating applications. It has been formulated for excellent fine line reproduction, surface conformity and high productivity through the manufacturing process. LAMINAR GA has been designed for both wet and dry lamination, with excellent yields and broad process latitude.

LAMINAR GA is formulated for high yields and increased productivity of fine line inner layer boards. With excellent flow characteristics, it works well for special processes such as deep gold plating, selective tin/lead stripping and rigid-flex.

PRODUCT USE

Print and Etch	Alkaline and acid
Acid Plating	Copper, tin/lead and methylsulfonic tin/lead plating baths, nickel, gold, and selective tin/lead strip.

PRODUCT DATA

Nominal Thickness

Mils	1.3	1.5	2.0	3.0
Microns	31	37	50	75

Phototropic Image

Unexposed colour	Light Blue
Exposed colour	Dark Blue

LAMINATION

The surface on which LAMINAR GA is to be laminated must be free of dirt, oils, oxidation and other contaminants. The surface should be neutral to slightly acidic and free of moisture.

Table I shows the recommended processing conditions with Shipley recommended laminators.

Table I - Lamination

Model 300/360 Hot Roll Laminators

Roll Temperature	106-118°C
Laminating Speed	0.9-1.5 m/min

1600 SPC Automatic Cut Sheet Laminator

Roll Temperature	106-118°C
Roll Speed	1.8-3.2 m/min
Roll Pressure	4-6 bar (59 - 72 psi)
Tack Bar Temperature	50-60°C
Tack Time	2-5 sec
Panel Entrance Temp	20-49°C)
Panel Exit Temperature	O/L 45-54°C I/L 60-65°C

Table II - Vacuum Lamination

724/730 Vacuum Laminators

Platten Temp	70-100°C
Cycle Time	15-55 sec
Slap Down Time	8-15 sec

Table II provides typical process conditions for vacuum lamination.

Vacuum lamination can be used with GA 20 for special applications. Parameters will vary with the size and thickness of panels being laminated.

EXPOSURE

Table III gives the recommended exposure parameters for LAMINAR GA Dry Film Photopolymer. Because of difference in equipment and lamps, the correct exposure in mJ/cm² must be determined for each unit.

Table III - Exposure

	GA10/13	GA15	GA20	GA30	GA40
Radiometer mJ/cm ²	25-60	30-65	40-75	55-85	60-95
	Resist	Copper			
Stouffer 21 Step Density Tablet	7-9	8-10			
Stouffer 41 Step Density Tablet	19-25	22-28			

DEVELOPMENT

Remove the polyester cover sheet and spray with a developer solution as described in Table IV. Developing time will be affected by temperature, spray pattern, spray pressure and pH of the developer.

Table IV - Developing

Solution	Temperature	Breakpoint
Sodium carbonate 0.75%-1.0% (monohydrate)	29-35°C	50-65%
Potassium carbonate 0.75%	29-35°C	50-65%
REsolve 211 0.75-1.0%	29-35°C	50-65%

Warm water rinses at 21-25°C are recommended. Use FOAMklear AF2750 at 0.1-0.5ml/l. **DO NOT** use antifoams containing water miscible solvents, such as butyl cellosolve.

ETCHING

Boards can be processed immediately after development to etching. Etching can be achieved by either acid or alkaline etchants as shown in Table V.

Table V - Etching

Etchant	pH Range
Alkaline	7.8-9.0
Acid	<3N

PLATING

LAMINAR GA can be processed through acid plating solutions in a pattern plating operation. A typical preplated cleaning process is given in table VI.

Table VI - Plating

Preplate Cleaning	Time
ADVANTAGE 2000 CLEANER LAC-81	2-3 min
Rinse Counterflow	1-2 min
Microetch	As required
Spray Rinse	1-2 min
Sulphuric Acid (10% by volume)	1-2 min
Spray Rinse (Optional)	1-2 min

Stripping

Stripping of LAMINAR GA can be achieved in conventional immersion or conveyORIZED equipment using either potassium hydroxide (KOH) or sodium hydroxide (NaOH) as shown in Table VII. Stripping should be followed by an immediate water rinse to reduce oxidation.

Table VII - Stripping

Potassium Hydroxide	1-3%	48-65°C
Sodium Hydroxide	1-3%	48-65°C

ALKASTRIP SQI and will more readily strip LAMINAR GA without attacking or oxidizing copper and solder plate surfaces. FOAMklear AF80 is the recommended antifoam.

STORAGE

Please read and understand this product's current Material Safety Data Sheet before use.

For optimum performance, and shelflife LAMINAR GA Dry Film Photopolymer should be stored in a limited access area between 5-15°C.

LAMINAR GA Dry Film Photopolymer is sensitive to sunlight and indirect white light. Gold or yellow fluorescent "Safe lights" are required in the immediate work area.

DISPOSAL INFORMATION

Utilize Shipley 2000 Waste Treatment Chemistry RSI 1240. Shipley's 2000 System will automatically compensate for the alkalinity of the waste material and add the ADVANTAGE 2000 chemistry to the stripper/developer waste in the correct proportion. After the treatment is completed, the solution is pumped to a filter press. See ADVANTAGE 2000 System technical data sheet for detailed procedure.

It is the customer's responsibility to ensure that the disposal of this product complies with national and local guidelines.

Handling Precautions

Before using this product, refer to the current Material Safety Data Sheet and the Laminar Safe Handling Guide for detailed safety, handling and storage information.

LAMINAR GA Dry Film Photopolymer should be applied in a well ventilated area. Commercial lamination equipment may cause vapours to be generated from the dry film, and these vapours should be removed by conventional exhaust techniques. Wash thoroughly after handling. Contact of the unexposed resist with the skin may cause irritation and should be avoided. Sensitization may occur in some individuals. If contact occurs, wash thoroughly with soap and water. If irritation occurs or persists, consult a physician.

Avoid reuse of or contact with the dry film release sheets and cover sheets, since they may retain small amounts of unpolymerized photoresist components.

During cleaning, developing, stripping, and etching operation, follow the safety precautions pertaining to the particular solution(s) being used.

For Industrial Use Only

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