

HUNTSMAN

Probimer[®] 77 GL – Black

High Performance, Alkaline Developed, Photoimageable Solder Mask

General

Probimer 77 GL Black is a high performance, three-component, aqueous developing, photoimageable solder mask and protective coating with superior nickel/gold plating compatibility. The material works with conventional screen-printing, exposure and aqueous developing equipment. Black is the blackest of blacks and once cured, the coating exhibits a gloss finish.

Typical Applications

Probimer 77 GL Black solder mask is especially useful over copper metal features for the protection of high density fine-line surface mount printed wiring boards and for use in double-sided and multilayer board applications. It can also be used over tin/lead, tin and tin/nickel.

Product Features and Benefits

- The “Blackest” Gloss surface finish
- “Best in Class” photo-speed; suitable for automatic exposure
- Outstanding resistance to surface finishes (ENIG, Pd, OSPs etc.)
- High resolution capability allows 4 mil solder dams
- Utilizes conventional screen printing production equipment and process technology
- Develops in standard aqueous chemistry and equipment.
- Three-component system with excellent stability and high solids content
- Wide process latitude means high productivity and yields (5 day pot-life, 5 day hold time and wide drying window)
- Conforms to IPC-SM-840C class T&H and Bellcore standards
- UL 94 V-0 approved
- Fulfills the most stringent requirements for electrical corrosion resistance and has outstanding moisture and insulation resistance

Components

Probimer 77/1060 Hardener 77/1068 Additive 77/1059

Form	Viscous liquid	Viscous liquid	Viscous liquid
Solids (%)	~68	~83	-75
Solvent	DPGM		
Viscosity	100 dPa/s		
DPGM is dipropylene glycol methyl ether			

Mixing Instructions

Probimer is provided in pre-measured units in a ratio of 4:1 Resin: Hardener (810g Resin: 190g Hardener: 50g Additive). Thoroughly mix Probimer 77/1060 and Hardener 77/1068 for 10-15 minutes then add Additive 77/1059 and mix for 10-15 minutes. Mixing can be done by hand with a spatula or with mild mechanical stirring. High shear mixing must be avoided in order to prevent entrainment of large amounts of air, which can cause bubbles and poor leveling of the printed coating.

Processing Parameters

Precleaning should be carried out in conventional pumice spray, chemical, or mechanical brushing equipment. The application of adhesion promoting coatings or oxide layers is not required or recommended. Hold times after precleaning should be minimized to avoid oxidation of copper surfaces.

Screen Printing

Probimer 77 GL Black is applied to printed wiring boards using manual or automatic screen printing equipment. Monofilament polyester mesh in the range of 83-110T is recommended.

The mesh should be applied to stable screen frames and tensioned to the mesh manufacturer's recommended tension, typically 18-22 Newton-cm. Use of a dot pattern on the screen is not necessary. The image area on the screen should be defined using a solvent resistant liquid block-out resin or film. Screen frames must be installed level with the screening table for best performance. Off-contact distance in the range of 0.195-0.273 inches is acceptable with this product. Polyurethane squeegees, 70 durometer with sharp edges, are required for printing. Conventional screen cleaning solvents can be used to clean screens, squeegees and other tools.

It is recommended that operators utilize the "snowplow" technique when printing to avoid skipping over circuitry which is parallel to the squeegee. On semi-automatic equipment, a slight angling of the squeegee mechanism is also recommended. Approximately 32 degrees is appropriate. This forms a wet film thickness of 35-45 microns (1.36-1.8 mils)

After printing, boards should be racked vertically to minimize contamination, taking care that the boards not touch each other. Any observed bubbles or surface roughness will level within 5 minutes.

Drying

A well-ventilated forced-air oven is required for drying Probimer 77 GL Black after printing and prior to exposure. The optimum drying condition is 85°C for 40-60 minutes. If a single sided process is utilized, the first side printed should be tack dried for 15-20 minutes. After coming to room temperature, the first side will be tack-free and second side can be printed. The completed board should then be dried for 35-45 minutes at 85°C.

In both cases, the total drying time should not exceed 70 minutes. This will prevent partial polymerization of the mask, which will inhibit complete development. Drying times can vary depending upon the efficiency and airflow of the oven. Test panels should be processed to optimize the drying cycle for the particular equipment.

Exposure

Probimer 77 GL Black is a bulk polymerizing material under UV exposure. The spectral sensitivity of Probimer 77 GL Black is in the range of 350 to 400 nm. Conventional exposure units having 7 kW lamps have been successfully used and are recommended. This type unit will provide an exposure time between 20-40 sec. Both diazo and silver halide films are suitable as working phototools.

Exposure Energy
Stouffer Step

350-450 mJ/cm²
clear copper 13-14

Development	Developing is carried out in an aqueous sodium or potassium carbonate solution. A concentration of 1% is recommended. Conventional aqueous spray developing machines, both horizontal and vertical, are suitable for use with Probimer 77 GL Obsidian Black.	
	Temperature	85-90°F
	Spray Pressure	20-40 psi
	Developing Time	60-90 sec

Inspection/Stripping	Probimer 77 GL Black coated panels should be inspected after development. Should panels require recoating, Probimer 77 GL Black can be stripped after developing in 3-5% sodium or potassium hydroxide solution at 120-140°F.
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Final Cure	Thermal curing is required to insure optimal properties in the cured film. Thermal curing can take place in a standard convection oven.			
		<u>Min</u>	<u>Max</u>	<u>Standard</u>
	Thermal Curing Temperature	140-150°C		150°C
	Thermal Curing Time	50-60 min.		60 min
UV Curing is recommended for increased chemical resistance of either 500 – 1000 mJ/cm ² prior to thermal curing or 1000 – 2000 mJ/cm ² after thermal curing.				

Physical Properties	Soldering Resistance (IPC SM-840C)	Passed
	Flux Resistance (IPC SM-840C)	Passed
	Solvent Resistance (IPC SM-840C)	Passed
	Thermal Shock Resistance (IPC SM-840C)	Passed
	Adhesion (IPC SM-840C)	Passed
	UL 94V-0	Passed
	Note: Conforms in accordance to IPC-SM-840C class T & H standards as verified by Huntsman (formerly Vantico) lab testing. Please refer to Trace Laboratories report #38245 for IPC-SM-840C base resin test results.	

Electrical Properties	Dielectric Strength	Passed
	Insulation Resistance (IPC-SM-840C)	Passed
	Electromigration (IPC-SM-840C)	Passed
	Moisture & Insulation Resistance	Passed
	Bellcore GR-78-CORE	Passed
	Note: Conforms in accordance to IPC-SM-840C class T & H standards as verified by Huntsman (formerly Vantico) lab testing. Please refer to Trace Laboratories report #38245 for IPC-SM-840C base resin test results.	

Safety/Handling Precautions	Warning! Combustible liquid and Vapor. Can cause allergic skin reactions. May cause irritation and dermatitis. Keep away from heat, sparks and open flame. Avoid contact with eyes, skin and clothing. Avoid breathing vapor, mist or spray. Use only good ventilation. Store in closed containers for liquid transfer to avoid static sparks. Wash hands after handling.
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**Read Material Safety Data Sheet Before Using these products.
FOR INDUSTRIAL USE ONLY.**

First Aid

In case of contact:

Eyes: Promptly flush with water for at least 15 minutes.

Skin: Promptly wash with mild soap and water.

Inhalation: Remove to fresh air. Give oxygen if breathing is difficult.

Ingestion: If conscious, give water. Get medical attention.

Important

The following supercedes Buyer's documents. **SELLER MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** No statements herein are to be construed

as inducements to infringe any relevant patent. Under no circumstances shall Seller be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with the product(s).

Buyer's sole remedy and Seller's sole liability for any claims shall be Buyer's purchase price. Data and results are based on controlled or lab work and must be confirmed by Buyer by testing for its intended conditions of use. The product(s) has not been tested for, and is therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended.

The test data and results set forth herein are based on laboratory work and do not necessarily indicate results that the buyer or user will attain. Full-scale testing and product performance is the responsibility of the buyer and user.

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