

# **HUNTSMAN**

## **High Performance Photoimageable Solder Mask 2 Component, Aqueous Developable**

### **Technical Data Sheet**

## **PROBIMER<sup>®</sup> 77/1100 (Dark Green) Screen Print System**



**Superior Hiding Power**



**High Resolution Capability**



**Excellent Ni/Au Final Finish Performance**



**Wide Process Latitude**

# Probimer<sup>®</sup> 77 /1100

## with Hardener 77/1050

### Screen Print Solder Mask

#### General

Probimer 77/ 1100 with Hardener 77/1050 is a high performance, two component, aqueous developed, solder mask and works with conventional screen-printing, exposure and aqueous developing equipment. Probimer 77/1100 is designed to provide high resolution, excellent electroless Ni/Au performance, and a wide drying window. Its dark green color provides excellent hiding power.

#### Typical Applications

Probimer 77 Screen Print Systems 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

- Outstanding compatibility with surface finishes (ENIG, Pd, OSPs, Au & Sn)
- High-resolution capability, allowing 2 mil solder dams.
- Utilizes conventional screen-printing production equipment and process technology.
- Develops in standard aqueous chemistry and equipment.
- Two-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.

#### Probimer 77 (Dark Green) Screen Print Components

	Probimer 77/1100	Hardener 77 /1050
Form	Viscous liquid	Viscous liquid
Color	Dark Green	Green
Solids (%)	~66	76-84
Mixed Solids (%)	~69	
Solvent	DPM <sup>1</sup>	DPM <sup>1</sup>
Flash Point	70° C(158°F)	50°C (122°F)
Viscosity	30-80K cps	15-100K cps
Mixed Viscosity	25- 40K cps	
Mix Ratio	3.12 kg	0.78 kg

<sup>1</sup> dipropylene glycol methyl ether

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## Processing Parameters

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### Mixing Instructions

Probimer 77/1100 Screen Print System is provided in pre-measured units. Mixing of Probimer 77/1100 and Hardener 77/1050 can be done by hand with a spatula or with a small mixer, without creating a vortex, for 5-10 minutes. High shear mixing must be avoided in order to prevent entrapment of large amounts of air, which can cause bubbles and poor leveling of the printed coating.

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### Precleaning

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

Note: For copper panels that have strong oxidation, a commercially available acid solution is recommended prior to precleaning.

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### Screen Printing

Probimer 77/1100 Screen Print System is applied to printed wiring boards by using manual or automatic screen printing equipment. Monofilament polyester mesh in the tested range of 81-140 is recommended. Note: Standard DP-1500 recommended mesh setting is 92.

The mesh should be applied to stable screen frames and tensioned to the mesh manufacturer's recommended tension, typically 20-26 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, 70-80 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.

<b>Drying</b>	<p>A well-ventilated forced-air oven is required for drying Probimer 77/1100 Screen Print System after printing and prior to exposure. The optimum drying condition is 80-90°C for 35-50 minutes. If a single sided process is utilized, the first side printed should be tack dried for 15 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 30-35 minutes at 80-90°C.</p> <p>In both cases, the total drying time should not exceed 50 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.</p> <p><u>Note:</u> The above drying conditions may vary according to the drying equipment, set up and development conditions. Test panels should be processed to optimize the drying cycle for the particular equipment.</p>												
<b>Exposure</b>	<p>Probimer 77 Screen Print Systems is a bulk polymerizing material under UV exposure. The spectral sensitivity of Probimer 77 Screen Print Systems 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 of unit will provide an exposure time between 10-30 sec. Both diazo and silver halide films are suitable as working phototools.</p> <table> <tr> <td>Exposure Energy</td> <td>400-500 mJ/cm<sup>2</sup></td> </tr> <tr> <td>Stouffer Step</td> <td>Clear Copper 13-15</td> </tr> </table>	Exposure Energy	400-500 mJ/cm <sup>2</sup>	Stouffer Step	Clear Copper 13-15								
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<b>Development</b>	<p>Developing is carried out in an aqueous sodium or potassium carbonate solution. A concentration of 1% is recommended. Conventional aqueous spray developing machines, either horizontal or vertical are suitable for use with Probimer 77 Screen Printing Systems.</p> <table> <tr> <td>Temperature</td> <td>85-90°F</td> </tr> <tr> <td>Spray Pressure</td> <td>20-40 psi</td> </tr> <tr> <td>Developing Time</td> <td>60-90 sec</td> </tr> <tr> <td>pH</td> <td>10.5-11.2</td> </tr> </table>	Temperature	85-90°F	Spray Pressure	20-40 psi	Developing Time	60-90 sec	pH	10.5-11.2				
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<b>Inspection/Stripping</b>	<p>Probimer 77 Screen Print Systems coated panels should be inspected after development. Should panels require recoating, Probimer 77 Screen Print Systems can be stripped after developing in 3-5% sodium or potassium hydroxide solution at 120-140°F.</p>												
<b>Final Cure</b>	<p>Thermal curing is required to insure optimal properties in the cured film. Thermal curing can take place in a standard convection oven.</p> <table> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> <th>Standard</th> </tr> </thead> <tbody> <tr> <td>Thermal Curing Temperature</td> <td>140-155°C</td> <td>150°C</td> <td></td> </tr> <tr> <td>Thermal Curing Time</td> <td>50-70 min</td> <td>60 min</td> <td></td> </tr> </tbody> </table> <p>UV Curing is recommended for increased chemical resistance of either 500 – 750 mJ/cm<sup>2</sup> prior to thermal curing or 1000 – 2000 mJ/cm<sup>2</sup> after thermal curing.</p>		Min	Max	Standard	Thermal Curing Temperature	140-155°C	150°C		Thermal Curing Time	50-70 min	60 min	
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<b>Electrical Properties</b>	Dielectric Strength Insulation Resistance (IPC-SM-840C) Electromigration (IPC-SM-840C) Bellcore GR-78-Core	Passed Class T,H Passed Class T,H Passed Class T,H Passed
<b>Safety/Handling Precautions</b>	<p><b>Warning! Combustible liquid and Vapor. Can cause allergic skin reactions.</b></p> <p>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.</p> <p><b>Read Material Safety Data Sheet Before Using these products. FOR INDUSTRIAL USE ONLY.</b></p> <p><b>Recommended Storage Temperature : 10°C to 25°C</b></p>	
<b>First Aid</b>	<p><b>In case of contact:</b></p> <p><b>Eyes:</b> Promptly flush with water for at least 15 minutes. <b>Skin:</b> Promptly wash with mild soap and water. <b>Inhalation:</b> Remove to fresh air. Give oxygen if breathing is difficult. <b>Ingestion:</b> If conscious, give water. Get medical attention.</p>	
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