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Advanced Materials

TECHNICAL DATA SHEET

Probimer® 77 7179 / 77 7180 Solder Mask

GENERAL

High Performance Photoimageable Solder Mask - Alkaline Developable Two-Component-Systemfor Flood Screen Print Application

Probimer® 77/7179 Solder Mask is a photoimageable, negative working solder mask optimized for flood screen print application. The solder mask exhibits a semi-matte surface. Probimer 77/7179 Solder Mask offers high process flexibility and excellent small hole developability with high aspect ratio. It is developed in an aqueous alkaline solution.

PROPERTIES

- Two-component-system, semi-matte surface
- High resolution
- Excellent small hole developability with high aspect ratio
- Optimized for long hold times between individual process steps
- Wide process windows offer high flexibility
- Excellent chemical, electrical and physical end properties
- Fulfills the requirements of IPC SM-840-C, classes H & T
- Corresponds to the requirements of well-known OEMs
- High comparative tracking index (CTI) and high dielectric strength
- Excellent adhesion of conformal coatings
- High resistance with aggressive post solder mask processes
- Ideally suited for SIT process (Second Image Transfer)

PRODUCT COMPONENTS

Probimer 77/7179 Solder Mask is a two-component-system. It is provided in ready-to-mix packages

	Probimer 77/7179 Solder Mask	Probimer 77/7180 Solder Mask
Product Components	Resin	Hardener
Mix Ratio	2.35 kg	0.52 kg

PROCESS RECOMMENDATIONS

Room Requirements on Working Environment
In order to reach best results the following room requirements should be respected:

- Room Temperature: 22 ± 2℃ (71.6 ± 35.6 ℉)
- Relative Humidity 50 ± 5%
- Cleanroom Class 100'000
- Overpressure Cleanroom + 3 mm WS
- UV blocked light

Mixing
Thoroughly mix the 3 components for 10-15 minutes. Mixing should be done with gentle mechanical stirring or shaking. 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.
Dilution is generally not required. In specific cases a diluent may be added. We recommend a maximum dilution of 3% with Dipropyleneglycolmonomethylether (DPM).

Pot Life
At room temperature the ready-to-use mixture has a pot life of 3 days. (Definition of pot life is related to increased dwell time in developer.)

Pre-Cleaning
For a good adhesion of the lacquer we recommend chemical and/or mechanical pre-cleaning. Hold times prior to coating have to be minimized, since oxidation may impair the adhesion of the lacquer. Only completely dried boards should be coated, this has to be ensured especially for boards with small holes (microvia technology).

Screen Printing
Probimer 77/7179 Solder Mask is applied to printed wiring boards using vertical or horizontal screen printing equipment. Monofilament polyester mesh in the range of 32-43 (mesh/cm) or 80-110 (mesh/inch) is recommended.

Flash-off / Drying
Probimer 77/7179 is applied to printed wiring boards using vertical or horizontal screen printing equipment. Monofilament polyester mesh in the range of 32-43 (mesh/cm) or 80-110 (mesh/inch) is recommended.
A flash-off time of 10 minutes before drying is recommended. To achieve good performance in resolution, developability of small holes and resistance to finishing processes the coated boards must be dried according to the following parameters:

Process Parameters	side	time	temperature
Horizontal(single-sided)	Side 1	15-20 min.	80-85℃ (176-185℉)
	Side 2	35-45 min.	80-85℃ (176-185℉)
Vertical (double-sided)	Side 1 and 2	40-60 min.	80-85℃ (176-185℉)

Exposure
A hold time prior to exposure is not necessary. The spectral sensitivity is in the range of 350 - 420 nm. The exposure time depends on the parameters for the developing step.

Process Parameters	**from**	**to**	**standard**
Energy (mJ/cm2) – Fe doped lamp	200	400	300
Stouffer step clear on Cu (21-step, D = 0.15)	8	12	10
Hold time after exposure	not required		

Exposure energy: measured by IL 390 B Light Bug

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PROCESS RECOMMENDATIONS

Developing

The areas of unexposed Probimer 77/7179 lacquer should be developed in a continuous spray developing line. Developing is carried out in a 0.8-1.2 % aqueous alkaline solution.

Process Parameters	from	to	standard
Developing temperature in ℃ (in ℉)	30 (86)	35 (95)	32 (89.6)
Dwell time under spray (sec)	60	90	60
Spray pressure in MPa (psi)	0.3 (30)	0.4 (40)	0.3 (30)

Inspection and Stripping

In case of mishandling during exposure, such as mis-registration, boards can be stripped at 60-80℃ (140-176℉) with 10% NaOH solution.

Final Curing

Thermal curing is required to ensure optimal properties in the cured film. It can be done in a standard convection oven.

Process Parameters	from	to	standard
Air temperature in ℃ (in ℉)	145 (293)	155 (311)	150 (302)
Temperature hold time (min)	45	70	60

After curing Probimer lacquers exhibit extremely high chemical resistance and, thus, cannot be easily removed without damaging the board.

UV-Curing

After thermal curing, we recommend UV curing of 1000–2000 mJ/cm2 for increased chemical resistance.

Legend Inks and Conformal Coatings

In general, legend inks and conformal coatings exhibit good to excellent adhesion to boards coated with Probimer 77/7179. However, due to the large variety of available products preliminary trials are strongly recommended.

Production Release Trials

A variety of flow agents, soldering machines and soldering techniques as well as cleaning processes are used to mount components on circuit boards. Adjustment of the processing parameters and design guidelines to ensure optimal use of solder masks leads to the best overall results. Users should carry out their own tests prior to release for production runs.

PROPERTIES

Physical Properties

Solid content ready for use	PR 2/85 (internal test norm)	70-72 weight %
Boiling water test	JPCA-ES-01/1999	passed
Adhesion on copper (cross hatch)	ISO 2409	0-1 GT
Pencil hardness	IPC TM 650 2.4.27.2a	7-8 H
Resolution (solder dams after HAL)		2-3 mil

Chemical Properties

Solvent resistance	Isopropanol	> 1h
	MEK	> 1h
	1,1,1-Trichlorethane	> 1h
	Methylenchloride	> 30 min.
Resistance to	E'less Ni/Au	passed
	E'less Sn, Ag	passed
	Org. Surface Passivations	passed
	"HASL" horizontal and vertical	passed
Ionic contamination	IPC TM 650 2.3.25	passed

Electrical Properties				
Dielectric strength	IEC 60243-1			120-130 V/m
Surface resistance	IEC 60167			10^{13}-10^{14}
Volume resistivity	IEC 60093			10^{14}-10^{15} /cm
Comparative Tracking Index (CTI)	IEC 60112			600 – 0.0 V 1)
Dielectric constant r at 1 MHz	IEC 60250			3.8-4.2
Dielectric loss factor tan	IEC 60250	(77 ℉)	25℃	3.0 % ± 0.1
at 50 Hz		(122 ℉)	50℃	5.4 % ± 0.2
		(167 ℉)	75℃	8.4 % ± 0.3
		(212 ℉)	100℃	10.0 % ± 0.4
		(248 ℉)	120℃	12.0 % ± 0.5

Approvals

UL 94 V-0	Underwriter Laboratories Inc.	passed
IPC SM-840 C, Classes H&T [1)]	Trace Laboratories	passed
Bellcore TR-TSY-00078	Internal test	passed
Siemens SN 47044	Internal test	passed
Siemens SN 57030	Internal test	passed
Siemens SN 57047	Internal test	passed
Bosch Y 273 R80 029	Internal test	passed

1) The norm IPC SM 840 C, H&T, includes the following tests:
Visual inspection, fungus resistance, hydrolytic stability, dielectric strength, dimensional stability, adhesion on copper, machinability, abrasion, pencil hardness, resistance to solvents and fluxes, solderability and resistance to solder, insulation resistance before and after soldering, electro migration, thermal shock.

STORAGE / EXPIRATION

Probimer lacquers are complex chemical compounds. To ensure that these products exhibit consistent quality in application we recommend storage under the following conditions:

- PROBIMER 77/7179 Solder Mask in original container at 5-25℃ (41-77℉)
- Hardener 77/7180 Solder Mask in original containers at 5-25℃ (41-77℉)

Under 'EXP' on the package label, the expiry date is indicated. Within this period the product should be used.

HANDLING PRECAUTIONS

The appropriate industrial hygiene precautions and safety regulations should always be observed when handling our products.
PROBIMER products contain flammable solvents. Contact with heat, spark and open flame is hazardous.

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Legal Notice

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