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Photo Imageable Solder Mask  
For  
Flexible Boards

PSR-4000 FLX101/ CA-40 FLX101

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**1. FEATURES**

PSR-4000 FLX101/CA-40 FLX101 is a dual-component, alkaline developable liquid photo imageable solder mask for screen printing use for flexible PCB, having the following features:

- 1) Excellent flexibility.
- 2) Excellent electroless Ni/Au plating and solder heat resistance.
- 3) Non halogen content and low outgas emission.

**2. SPECIFCATION**

Product name	PSR-4000 FLX101/ CA-40 FLX101
Color *	Green
Mixing ratio	Main agent : 70     Hardener : 30     (by weight)
Viscosity *	180±20dPa·s     (E model viscometer 5min <sup>-1</sup> /25degC)
Solid content *	72 wt%
Specific gravity *	1.1
Tack dry window*	80degC / 60 min. (Maximum)
Exposure energy *	400 - 600 mJ/ cm <sup>2</sup> (under Mylar film) 280 - 420 mJ/ cm <sup>2</sup> (on ink surface)
Pot life *	24 hours (Stored at dark place, 25degC or below)
Shelf life	180 days after production (Stored at dark place , 20degC or below)

\* After mixing with hardener.

## 2. PROCESS

Process	Condition	Tolerance window
Test panels	FR-4 T=1.6mm	
Surface preparation	Acid treatment - Scrubbing	
Printing	#100 mesh Tetron screen	[#100-150mesh]
Hold time	10 min.	[10-20min.]
Tack dry	a) Double side printing	
(Hot air convection oven)	1st side 80degC /15min.	[10-25min]
	2nd side 80degC /25min.	[20-35min.]
	b) Single side printing	
	80degC /30min.	[20-60min.]
Exposure	Metal halide lamp 7kW (ORC HMW-680GW)	
	400 mJ / cm <sup>2</sup> (under Mylar film)	[400-600 mJ /cm <sup>2</sup> ]
	280 mJ / cm <sup>2</sup> (on ink surface)	[280-420 mJ /cm <sup>2</sup> ]
Hold time	10 min	[10-20min]
Development	Developer 1wt% Na <sub>2</sub> CO <sub>3</sub>	
	Temperature 30degC	
	Spray pressure 0.2 MPa	[0.2-0.25 MPa]
	Dwelling time 60 sec.	[60-100 sec.]
Water rinse	Temperature 25degC	[30degC or below]
	Spray pressure 0.1 Mpa	[0.1-0.15 MPa]
	Dwelling time 45 sec.	[45-60 sec.]
Post cure	150degC/ 60min.	[30-90min]
(Hot air convection oven)		

### **3. ATTENTION**

- Operation environment for printing should be in the clean room and 20-25deC, 50-60%RH under yellow lamps (Avoid sun light and fluorescent lamp).
- Open the can after the ink becoming ambient temperature. Mix the specified quantity of hardener with the main agent and stir well enough.
- The adequate coating thickness is 10-20microns on copper after curing. Thinner coating may reduce the end properties of the product. Thicker coating may cause undercut and tacky surface.
- Set the optimum tackdry condition and drying window after adjusting to your own equipment and production throughput plan.
- Both ether and ester solvent can be used for screen cleaning.
- Required exposure energy is variable depending on type of base laminate and coating thickness. We recommend to check the remaining dam width and the undercut level after development to set exposure energy.
- Control well your quality of developing bath, spray pressure and dwelling time.
- Set the curing condition considering curing time of legend ink. Too much or less curing may deteriorate the end properties of the products.
- Use the ink without dilution. When necessary, add less solvent as possible (MAX 2wt%). Over dilution may deteriorate the properties.

3. CHARACTERISTICS

1. Tack dry window

Drying Time (80degC / min.)	30	40	50	60	70
Developability	Good	Good	Good	Good	Fair

2. Hold time to development

Hold time (hours)	48	72	96	120	144
Developability	Good	Good	Good	Good	Fair

3. Photosensitivity

Item	Coating thickness	Exposing energy	Developing time	Photo sensitivity
Sensitivity Kodak No.2	22 +/- 2microns	400 mJ/cm <sup>2</sup> (280 mJ/cm <sup>2</sup> )	60sec.	5 steps
		500 mJ/cm <sup>2</sup> (350 mJ/cm <sup>2</sup> )		6 steps
		600 mJ/cm <sup>2</sup> (420 mJ/cm <sup>2</sup> )		7 steps

Resolution Remaining dam width (Between QFP pads)	40 +/- 2microns	400 mJ/cm <sup>2</sup> (280 mJ/cm <sup>2</sup> )	60sec.	60microns
		500 mJ/cm <sup>2</sup> (350 mJ/cm <sup>2</sup> )		60microns
		600 mJ/cm <sup>2</sup> (420 mJ/cm <sup>2</sup> )		60microns

- \* Exposure energy is measured under Mylar film.  
Figures in ( ) is measured on ink surface.
- \* Resolution shows the remaining line width between QFP.

4. End Properties

Item	Test Conditions	Result
Adhesion	GIP* Cross hatch peeling	100 / 100
Pencil hardness	GIP* No scratch on copper	5H
Solder heat resistance	Rosin flux 260degC/10sec × 2cycles	Pass
Solvent resistance	PGM-Ac 20degC/ 30min immersion and tape peeling.	Pass
Acid resistance	10vol% H <sub>2</sub> SO <sub>4</sub> 20degC/ 30min immersion and tape peeling	Pass
Alkaline resistance	10wt% NaOH 20degC/ 30min immersion and tape peeling	Pass
Breakdown voltage	GIP*	>3.2kV/mil
Volume resistivity	GIP*	1.5x10 <sup>16</sup> Ohm-cm
Surface resistance	GIP*	3.5x10 <sup>13</sup> Ohm
Insulation resistance	IPC comb type (B pattern) 25- 65degC cycle, 90%RH DC 100V for 7 Days. DC500V for 1min value	Initial 8.3 × 10 <sup>12</sup> Ohm Conditioned 4.5 × 10 <sup>11</sup> Ohm
Dielectric constant	GIP* 1MHz value 25- 65degC cycle, 90%RH DC 100V for 7 Days. Measured at room temp	Initial 3.3 Conditioned 3.6
Dissipation factor	GIP* 1MHz value 25- 65degC cycle, 90%RH DC 100V for 7 Days. Measured at room temp	Initial 0.019 Conditioned 0.026

Electroless Ni/Au plating	Ni-3microns, Au-0.03microns	Pass
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\* GIP stands for Taiyo internal test method.

PSR-4000 FLX101/ CA-40 FLX101

Item	Test Conditions	Result
Water absorption	GIP* 23degC, 24hous immersion	1.3%
Tg	TMA method	70degC
CTE	Lower Tg point	55-75ppm
	Upper Tg point	135-145ppm
Young's modulus	Internal test / room temperature Pull-up test 5mm/min Specimen 10x 40mm	2590Mpa
Elongation at break		10.0%
Tensile strength		Pass
Bendability	Internal test / Kapton 180deg bending	No crack
Total halogen content	Calculated value	306ppm

\*All test data mentioned above in this technical data sheet is based on our laboratory test result and only for reference, not to guarantee the same in your process.

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