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No. 26 Taishan Road  
Suzhou New District  
Suzhou Jiangsu  
P.R. China

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Z TAIYO INK (SUZHOU) CO., LTD.

Tel: +86-512-6665-5550  
Fax: +86-512-6665-5057

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Dual-component, alkaline developable

Liquid photo imageable solder mask

**PSR-4000 MH/ CA-40 MH**

April. 2003

**1. FEATURE:**

PSR-4000 MH / CA-40 MH is a Photo imageable liquid solder mask ink (alkaline –developable type), designed for screen printing with wide process window, high photo speed and resolution, excellent resistance to gold plating ( electro / electroless ) .

**2. SPECTIFICATIONS:**

Product name:	Main agent: PSR-4000 MH
	Hardener: CA-40 MH
Color:	Main agent: Green
	Hardener: Milk white
Mixing ratio:	Main agent: Hardener = 70 30 (by wt.)
Viscosity after mixing:	150±30 dPa.s (Cone-plate viscometer 5min <sup>-1</sup> /25 )
Solid content:	78 wt%
Specific Gravity:	1.4 (After mixing)
Tack dry window:	80 ×70min(Max)
Exposure:	200-400 mJ/cm <sup>2</sup> (Under Mylar film)
	140-280 mJ/cm <sup>2</sup> (On solder mask)
Post cure:	150 ×60min
Pot life:	24 Hrs. (stored at dark & lustration place and closed, 25 or below)
Shelf life:	180 days after production (stored at dark place, 20 or below)

**3. PROCESS CONDITIONS:**

Process	Condition	Tolerance window
Test panels:	FR-4 (thickness 1.6mm)	-
Pretreatment:	Acid rinse → Buff scrubbing → Water rinse → Dry	-
Print:	100mesh	[100-120mesh]
Hold time	10 min	[10-20 min]
Pre-cure:	A: double side printing using pin and double side exposure or single side exposure	[80 60min] ( Max )
	80 20-30min (Hot air convection oven)	
	B: two times printing and pre-cure for double side exposure	
	1 <sup>st</sup> : 80 10-15 min (Hot air convection oven)	
	2 <sup>nd</sup> : 80 20-25 min (Hot air convection oven)	
Exposure:	400 mJ/cm <sup>2</sup> (Under Mylar film)	[200-400 mJ/cm <sup>2</sup> ]
	280 mJ/cm <sup>2</sup> (On solder mask)	[140-280 mJ/cm <sup>2</sup> ]
	Halogen lamp 7kW (ORC HMW-680GW)	
Hold time:	10 min	[10-30 min]
Development:	Solution: 1wt% Na <sub>2</sub> CO <sub>3</sub>	-
	Temp. 30	-
	Spray pressure 0.196Mpa	[0.196-0.245Mpa]
	Time: 60s	[60-90s]
Water rinse:	Temp. 25	[20-30 ]
	Spray pressure 0.098Mpa	[0.098-0.147Mpa]
	Time: 60s	[45-60s]
Post cure:	150 60 min (Hot air convection oven)	[150 30-90 min]

**4. ATTENTION ON PROCESS:**

- a) As to operation environment, it is necessary to control temperature, humidity and dust. Please use the yellow lamp, or Ultraviolet ray filter .do not use the white lamp or sunlight.
- b) Incompetent mixing will cause quality problem, such as gloss uneven and post cure problem.
- c) The optimum coating thickness is 20 to 30  $\mu\text{m}$  (after curing); Thinner coating tends to lower the thermal and gold plating resistance. Thicker coating tends to longer cure time and impress when exposure.
- d) If the viscosity is too high to print, can use some solvent such as Diethylene Glycol Monoethyle Ether Acetate (Carbitol Acetate), the quantity of the solvent can not exceed 2%, (one Kg ink can add 20cc solvent at best), otherwise, it may cause teardrop or lower resistance to thermal and gold plating.
- e) As every plant's drying equipments, process condition and quality target is different, so the temperature and drying time may also have difference. Please do verification test to define the operating conditions.
- f) As every plant's exposure equipments, process condition and quality target is different, so the exposure energy and development time may also have difference. Please do verification test to define the operating conditions.
- g) Please adjust the development solution, temperature, spray pressure and time follow this data to decrease the undercut and get the excellent result.
- h) Insufficient cure of the ink can lower the thermal resistance, and excess cure can lower gold plating resistance. Furthermore, Curing condition of the solder mask ink should be defined together with the curing condition of the marking ink.

CA: Diethylene glycol monomethyl ether acetate (B.P 217 deg. C)

**5 . INK PROPERTIES:****5.1 TACK DRY WINDOWS:**

Drying time (80 )	40min	50min	60min	70min	80min
Developability (China)	OK	OK	OK	OK	NG
Developability (Japan)	OK	OK	OK	OK	NG

**5.2 PHOTO SENSITIVITY:**

Item	Thickness um	Energy mJ/cm <sup>2</sup>	Result	
			China	Japan
Sensitivity Kodak No.2	22±2	200	7step	7step
		300	8step	8step
		400	9step	9step
Resolution Between QFP pads	40±2	200	60 um	60 um
		300	50 um	50 um
		400	50 um	50 um

(1 min development)

**6. PROPERTIES:**

Item	Teat Method	Result	
		Made in China	Made in Japan
Adhesion	Taiyo internal method Cross hatch peeling	100 / 100	100 / 100
Pencil hardness	Taiyo internal method No scratch on copper	7H	7 H
Thermal resistance	Rosin flux 260 /10sec , 3cycles	Passed	Passed
Acid resistance	10vol% H <sub>2</sub> SO <sub>4</sub> 20 /30min. (Dip) Tape peeling test	Passed	Passed
Alkaline resistance	10wt% NaOH 20 /30min. (Dip) Tape peeling test	Passed	Passed
Solvent resistance	PGM-Ac 20 /30min. (Dip) Tape peeling test	Passed	Passed
Insulation resistance	IPC comb type (B pattern) Humidification: 25-65 /90%RH/ DC100V Measurement: DC500V 1min.	Initial $1.5 \times 10^{13}$ ohrm Conditioned $1.5 \times 10^{11}$ ohrm	Initial $1.1 \times 10^{13}$ ohrm Conditioned $2.5 \times 10^{11}$ ohrm
Electro gold plate	Internal lab test Ni 5um Au 1um	Passed	Passed
Electroless gold plate	Internal lab test Ni 3um Au 0.03um	Passed	Passed

Note:

- The above-mentioned data is based on TAIYO INK (SUZHOU) Company's laboratory test. As every plant's equipments, environment and parameters have difference, the data is only for your reference.
- Please work in accordance with MSDS.