No.26 Taishan Rord,Suzhou
New District, Suzhou City,
Jiangsu Province,P.R.China

TAIYO INK (SUZHOU) CO.,LTD.

Tel: +86-512-6665-5550
Fax: +86-512-6665-5015

Dual-component, alkaline developable
Liquid photo imageable solder mask

PSR-4000 G23K/ CA-40 G23K

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Data Sheet No.:DAS-031002/033002-00

1. FEATURES:

PSR-4000 G23K / CA-40 G23K is a liquid photo imageable solder resist ink (alkaline development type) used for screen printing application with a matt finish.

a) Excellent electro Ni/Au plating resistance.
b) Excellent electro-less Ni/Au plating resistance.
c) Low exposure energy

2. SPECIFICATINS:

Product name	Main agent	: PSR-4000 G23K
	Hardener	: CA-40 G23K
UL Suffix	Main agent	: PSR-4000DE
	Hardener	: CA-40DE
Color	Main agent	: Green
	Hardener	: White
Mixing ratio	Main agent : Hardener = 70 : 30 (by weight.)	
Viscosity	150±20dPa.s (Cone-plate viscometer 5min^{-1} /25℃, After mixing)	
Solid content	79±3wt% (After mixing)	
Specific gravity	1.4±0.1(After mixing)	
Tack dry window	80℃×60min(Max)	
Exposure energy	200-400 mJ/cm²(Under Mylar film)	
	140-280mJ/cm²(On solder mask)	
Post cure	150℃×60min	
Pot life	24 Hrs. (stored at dark & lustration place, 25℃ or below)	

3. PROCESS CONDITIONS:

Process	Conditions	Tolerance
Test panels:	FR-4 (thickness 1.6mm)	-
Pretreatment:	Acid rinse → Buff scrubbing → Water rinse → Dry	-
Coating	100 mesh-count, Tetron screen	[100-125 mesh]
Hold time:	10 min	[10-20 min]
Pre-cure:	Single side Coating	[80℃ 60 min]
	1st:80℃ 20-60 min (Hot air convection oven)	(Max)
	Double side Coating	
	1st:80℃ 10-25 min (Hot air convection oven)	
	2nd:80℃ 20-35 min (Hot air convection oven)	
Exposure:	900mJ/cm^2 (Under Mylar film)	[200-400mJ/cm^2]
	630mJ/cm^2 (On solder mask)	[140-280 mJ/cm^2]
	Halogen lamp 7kW (ORC HMW-680GW)	
Hold time:	10 min	[10-20 min]
Development:	Solution: 1wt% Na_2CO_3	-
	Temp.: 30℃	-
	Spray pressure: 0.2Mpa	[0.2-0.25Mpa]
	Time: 60 sec	[60-100sec]
Water rinse:	Temp.: 25℃	[20-30℃]
	Spray pressure: 0.1Mpa	[0.1-0.15Mpa]
	Time: 45 sec	[45-60 sec]
Post cure:	150℃ 60 min (Hot air convection oven)	[150℃ 30-90 min]

*In case of applying marking ink, solder mask should be cured at 150deg.C for 30 minutes, then marking ink should be cured at 140deg.C/20min for each side of PCB.

4. ATTENTION ON PROCESS:

a) As to the operation environment, it is desirable to deal with the ink under the yellow lamps in the clean room. Please avoid using it under white fluorescent lamps or sunlight (directly or indirectly).

b) The adequate thickness is 10-20 um (on the copper after curing). Thin coating possibly reduces its solder heat resistance. On the other hand, thick coating possibly causes the under-cut or low tackiness.

c) When the ink viscosity increased to difficult to print, you can use diluted solvent, such as Diethylene Glycol Monoethyle Ether Acetate (ie Carbitol Acetate) and Reducer-J, do not dilute the use of solvents than 2% (maximum per kg of ink can be added 20cc dilution solvent), there would be with the flow of ink, or gold-plating resistant strength and heat resistance decreased.

d) Please set the pre-cure conditions and tack dry window after the confirmation test because they are influenced according to the type of the drying machine and the quantity of the board to be dried.

e) Please set the exposing energy after the confirmation test of under-cut, surface gloss, back side exposure and so on because it is influenced according to the material of the board, the thickness of ink, etc.

f) Regarding the developing process, please control the developer density, the temperature, the spray pressure and the developer time, etc. The inadequacy of control causes the degradation of the developability and the increase of under-cut.

g) Please set the post cure conditions considering the curing time of the marking ink. Insufficient curing or over curing may cause the degradation of properties.

5. INK PROPERTIES:

5.1 TACK DRY WINDOWS:

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

5.2 PHOTO SENSITIVITY

Item	Thickness	Energy		Result
	um	mJ/cm^2 (under Mylar)	mJ/cm^2 (on S/M)	
Sensitivity Kodak No.2	22±2	200	140	6
		300	210	7
		400	280	8
Resolution Between QFP pads	40±2	200	140	50μm
		300	210	50μm
		400	280	50μm

(1 min development)

6. PROPERTIES:

Item	Teat Method	Result
Adhesion	Taiyo internal method Cross hatch peeling	100 / 100
Pencil hardness	Taiyo internal method No scratch on copper	7H
Solder heat resistance	Rosin flux 260℃/30sec，1cycles	Pass
Acid resistance	10vol% H_2SO_4 20℃/20min. (Dip) Tape peeling test	Pass
Alkaline resistance	10wt% NaOH 20℃/20min. (Dip) Tape peeling test	Pass
Solvent resistance	PGM-Ac 20℃/20min. (Dip) Tape peeling test	Pass
Insulation resistance	IPC comb type (B pattern) Humidification:25-65℃/90%RH/ DC100V 7Days Measurement:DC500V 1min.	Initial $1.0\times10^{12}\ \Omega$ Conditioned $1.0\times10^{10}\ \Omega$
Dielectric constant	Taiyo internal method Values at 1MHz Humidification:25-65℃/90%RH 7Days	Initial 4.50 Conditioned 5.50
Dissipation factor	Taiyo internal method Values at 1MHz Humidification:25-65℃/90%RH 7Days	Initial 0.025 Conditioned 0.045
Electro Ni/Au Plating resistance	TAIYO Internal Test method Ni: 5um / Au: 1um	Pass
Electro-less Ni/Au Plating resistance	TAIYO Internal Test method Ni: 3um / Au: 0.03um	Pass

Note: The above-mentioned data is based on lab test @TAIYO INK (SUZHOU), which is only for your reference, because every facility may provide different result.

7. Attention:

a) Please operate in accordance with MSDS.

b) Operate in area supported by local exhaust or general room ventilation to avoid build-up of high concentration of solvent vapors.

c) Use gloves and apron during operation. Wash with soap and water if ink is attached to the skin.

d) Wash hands and face with soap and water. Rinse out the mouth before eating or smoking.