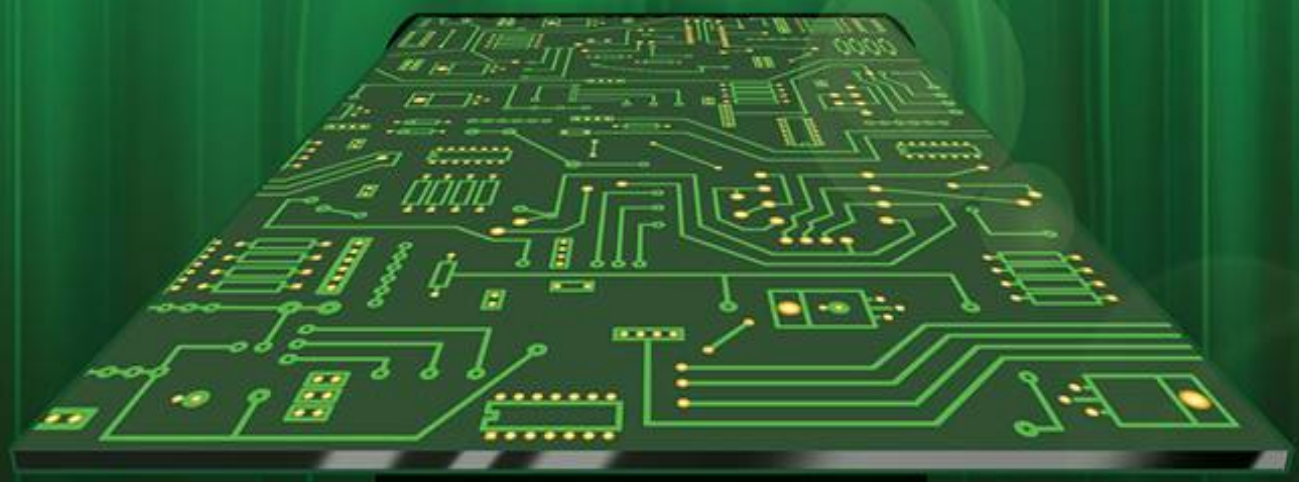
PSR-4000

CC01SE

BY TAIYO



TAIYO PSR-4000 CC01SE

(UL Name: Pending)

LIQUID PHOTOIMAGEABLE CURTAIN COAT SOLDER MASK

- **Curtain Coat Application**
- **Aqueous Developing Solder Mask**
- **RoHS Compliant**
- **Halogen-Free**
- **Compatible with Lead-Free Processing**
- **Wide Processing Window**
- **Excellent Resistance to ENIG & Immersion Tin**
- **Resistant to Hot Storage**

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TECHNICAL DATA SHEET

PROCESSING PARAMETERS FOR PSR-4000 CC01SE

PSR-4000 CC01SE COMPONENTS:

	PSR-4000 CC01SE	/ CA-40 CC01SE
Mixing Ratio	80 parts	20 parts
Color	Green	White

Mixed Properties

Solids	81%
Viscosity	185 – 225 ps
Specific Gravity	1.99

MIXING

PSR-4000 CC01SE is supplied in pre-measured containers with a mix ratio by weight of 80 parts, **PSR-4000 CC01SE** and 20 parts, **CA-40 CC01SE.** PMA solvent is added at 20-25%, of the mixed ink and hardener. **PSR-4000 CC01SE** can be mixed a mechanical mixer at low speeds to minimize shear thinning for 10 – 15 minutes. The resulting viscosity with the PMA addition should be between 60 – 100 seconds in a Ford #4 or Erichsen #4 cup at 24°C.

PRE-CLEANING

Prior to solder mask application, the printed circuit board surface needs to be cleaned. Various cleaning methods include Pumice, Aluminum Oxide, Mechanical Brush, and Chemical Clean. For full body gold an alkaline cleaner is recommended. All of these methods will provide a clean surface for the application of **PSR-4000 CC01SE.** Hold time after cleaning the printed circuit board should be held to a minimum to reduce the oxidation of the copper surfaces.

CURTAIN COATING

Method: Single Sided Coating

- Temperature: 24°C
- Slot Width: 0.4 – 0.5 mm
- Belt Speed: 70 – 100 m/min
- Wet Weight: 85 – 140 grams/m^2

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TACK DRY CYCLE

The Tack Dry step is required to remove solvent from the solder mask film and produce a firm dry surface. The optimum dwell time and oven temperature will depend on oven type, oven loading, air circulation, exhaust rate, and ramp times. Excessive tack dry times and temperature will result in difficulty developing solder mask from through holes and a reduction in photo speed. Insufficient tack dry will result in artwork marking and/or sticking. Typical tack dry condition for **PSR-4000 CC01SE** is as followed:

- Oven Temperature: 66 - 80°C (150 - 176°F)
- For Single-Sided (Batch Oven)
  - 1st Side: Dwell Time: 15 - 20 minutes
  - 2nd Side: Dwell Time: 15 - 40 minutes

EXPOSURE

PSR-4000 CC01SE requires UV exposure to define solder mask dams and features. The spectral sensitivity of **PSR-4000 CC01SE** is in the area of 365 nm. Exposure times will vary by bulb type and age of the bulb. Below are guidelines for exposing **PSR-4000 CC01SE**. Retention of smallest feature will determine the exposing energy.

- Exposure Unit: 8 kW or higher
- Stouffer Step 21: **Clear 9 minimum** (on metal / under phototool)
- Energy: 25mJ / cm^2 minimum (under phototool)

DEVELOPMENT

PSR-4000 CC01SE is developed in an aqueous sodium or potassium carbonate solution. Developing can be done in either a horizontal or vertical machine.

- Solution: 1% by wt. Sodium Carbonate or 1.2% Potassium Carbonate
- pH: 10.6 or greater
- Temperature: 85 - 95°F (29 - 35°C)
- Spray Pressure: 25 - 45 psi (1.7 – 3.1 bars)
- Dwell Time in developing chamber: 45 - 120 seconds
- Water rinse is needed to remove developer solution followed by a drying step

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FINAL CURE **PSR-4000 CC01SE** requires a thermal cure to insure optimal final property performance. Thermal curing can be done in a batch oven or conveyorized oven.

- Temperature: 275 – 300°F (135 – 149°C)
- Time at Temperature: 45 – 60 minutes

UV CURE To improve moisture and chemical resistance a UV cure of 2 – 3 J/cm^2 is recommended.

For Process Optimization please contact your local Taiyo America Representative

Taiyo America, Inc. (TAIYO) warrants its products to be free from defects in materials and workmanship for the specified warranty period **PSR-4000 CC01SE / CA-40 CC01SE Warranty period is 12 Months** provided the customer has, at all times, stored the ink at a temperature of 68°F or less. TAIYO accepts no responsibility or liability for damages, whether direct, indirect, or consequential, resulting from failure in the performance of its products. If a TAIYO product is found to be defective in material or workmanship, its liability is limited to the purchase price of the product found to be defective. TAIYO MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE. TAIYO'S obligation under this warranty shall not include any transportation charges or costs of installation or any liability for direct, indirect, or consequential damages or delay. If requested by TAIYO, products for which a warranty claim is made are to be returned transportation prepaid to TAIYO'S factory. Any improper use or any alteration of TAIYO'S product by the customer, as in TAIYO'S judgment affects the product materially and adversely, shall void this limited warranty.

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FINAL PROPERTIES FOR PSR-4000 CC01SE

IPC-SM-840E, Class H & T, Solder Mask Vendor Testing Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Visual	3.3.1	Uniform in Appearance	Pass
Curing	3.2.5.1	Ref: 3.6.1.1, 3.7.1 and 3.7.2	Pass
Non-Nutrient	3.2.6	Does not contribute to biological growth	Pass
Pencil Hardness	3.5.1	Minimum "F"	Pass – 6H
Adhesion	3.5.2.1	Rigid – Cu, Ni, FR-4	Pass
Adhesion	3.5.2.6	Doubled Layered Solder Mask	Pass
Machinability	3.5.3	No Cracking or Tearing	Pass
Resistance to Solvents and Cleaning Agents	3.6.1.1	Table 3 Solvents	Pass
Hydrolytic Stability and Aging	3.6.2	No Change after 28 days of 95-99°C and 90-98% RH	Pass
Solderability	3.7.1	No Adverse Effect J-STD-003	Pass
Resistance to Solder	3.7.2	No Solder Sticking	Pass
Resistance to Solder	3.7.3	No Solder Sticking	Pass
Simulation of Lead Free Reflow	3.7.3.1	No Solder Sticking	Pass
Dielectric Strength	3.8.1	500 VDC / mil Minimum	3123 VDC/mil (123 VDC / µm)
Thermal Shock	3.9.3	No Blistering, Crazing or De-lamination	Pass

Specific Class "H" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Flammability	3.6.3	UL 94V-0	In Progress
Insulation Resistance	3.8.2		
Before Soldering		5×10^8 ohms minimum	Pass (2.0×10^{13} ohms)
After Soldering		5×10^8 ohms minimum	Pass (3.2×10^{13} ohms)
Moisture & Insulation Resistance	3.9.1		
Before Soldering–In Chamber		5×10^8 ohms minimum	Pass (3.2×10^{11} ohms)
Before Soldering–Out of Chamber		5×10^8 ohms minimum	Pass (2.8×10^{12} ohms)
After Soldering-In Chamber		5×10^8 ohms minimum	Pass (7.7×10^{10} ohms)
After Soldering-Out of Chamber		5×10^8 ohms minimum	Pass (7.6×10^{12} ohms)
Electrochemical Migration	3.9.2	>2.0×10^6 ohms, no growth	Pass (1.3×10^{12} ohms)

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FINAL PROPERTIES FOR PSR-4000 CC01SE

Specific Class "T" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Flammability	3.6.3	Bellcore 0_2 Index – 28 minimum	Pass – 89
Insulation Resistance Before Soldering After Soldering	3.8.2	 5×10^8 ohms minimum 5×10^8 ohms minimum	 Pass (1.5×10^{11} ohms) Pass (6.5×10^{10} ohms)

Specific Class "T" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Moisture & Insulation Resistance	3.9.1		
Before Soldering–In Chamber		5×10^8 ohms minimum	Pass (1.6×10^9 ohms)
Before Soldering–Out of Chamber		5×10^8 ohms minimum	Pass (1.8×10^{13} ohms)
After Soldering-In Chamber		5×10^8 ohms minimum	Pass (2.5×10^9 ohms)
After Soldering-Out of Chamber		5×10^8 ohms minimum	Pass (9.2×10^{12} ohms)
Electrochemical Migration	3.9.2	< 1 decade drop, no dendritic growth	Pass

Additional Tests / Results

TEST	REQUIREMENT	RESULT
Adhesion	GIP-008AA (TAIYO Internal Test Method) Cross-cut tape stripping test	100/100
Solder Heat Resistance	Solder float test: Rosin Flux 300°C/30sec., 1 cycle	Pass
Solvent Resistance	PGM-AC dipping, temp 20°C. / 20 min, Tape peeling test	Pass
Acid Resistance	10 vol% H_2SO_4, temp 20°C. / 20 min, Tape peeling test	Pass
Alkaline Resistance	10 wt% NaOH, temp 20°C. / 20 min, Tape peeling test	Pass
Electroless Ni/Au	TAIYO Internal Test Method Ni: 3 microns, Au: 0.03 microns	Pass
Immersion Tin Plating resistance	TAIYO internal test method Tin thickness: about 1 um	Pass
Total Halogen content	Calculated value from raw materials	250 ppm
Hot Storage Resistance	165ºC for 500 hours – cross hatch adhesion	Pass

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