Technical Data Sheet

TAIYO PSR-9000A02 Series

LIQUID PHOTOIMAGEABLE COVERCOAT

- **Specifically Designed for Flexible Printed Circuit Boards**
- **Available in Amber or Green with a Glossy Finish**
- **Screen Print Application**
- **Develops out of Small Via Holes**
- **Excellent Resistance to ENIG and Immersion Tin**
- **Fine Dam Resolution**
- **Low Odor**

TAIYO AMERICA, INC.®
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PROCESSING PARAMETERS FOR PSR-9000A02 SERIES

PSR-9000A02 Series is a two-component, alkaline developable LPI covercoat for flood screen application. The product was designed specially for flex printed circuit broads and is user friendly with a wide processing latitude, low odor, fast developing and good resistance to alternate metal finishes such as ENIG and immersion Tin while maintaining dams of 3 mils or less. **PSR-9000A02 Series** is available in both Amber and Green. **PSR-9000A02 Series** meets or exceeds the requirements of IPC SM-840C Class H and Class T along with Bellcore GR-78-CORE Issue 1.

PSR-9000A02 SERIES COMPONENTS

	PSR-9000A02 Series	/ CA-90A02
Mixing Ratio	100 parts	43 parts
Color	Amber or Green	White
Mixed Properties		
Solids	70%	
Viscosity	140-200ps	
Specific Gravity	1.13	

MIXING

PSR-9000A02 Series is supplied in pre-measured containers with a mix ratio by weight of 100 parts **PSR-9000A02** and 43 parts **CA-90 A02. PSR-9000A02** can be mixed by hand with a mixing spatula for 10 – 15 minutes. Mixing can be done with a mechanical mixer at low speeds to minimize shear thinning for 10 – 15 minutes. Also, mixing can be done with a paint shaker for 10 – 15 minutes.

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. All of these methods will provide a clean surface for the application of **PSR-9000A02 Series**. Hold time after cleaning the printed circuit board should be held to a minimum to reduce the oxidation of the copper surfaces.

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SCREEN PRINTING

Method: Single Sided and Double Sided Screening

- Screen Mesh: 92 – 110
- Screen Mesh Angle: 22.5° Bias
- Screen Tension: 20 - 28 Newtons
- Squeegee: 60 – 80 durometer
- Squeegee Angle: 27 – 35°
- Printing Speed: 2.0 – 9.9 inches/sec
- Printing Pressure: 70 – 100 psi

TACK DRY CYCLE

The Tack Dry step is required to remove solvent from the covercoat 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 out of through holes and a reduction in photo speed. Insufficient tack dry will result in artwork marking and/or sticking. Typical tack dry conditions for **PSR-9000A02 Series** are as followed:

- Hold Time after Screen Printing: 10 minutes
- Oven Temperature: 174 - 185°F (79 - 85°C)
- For Single-Sided (Batch Oven)
  - 1st Side: Dwell Time: 10 - 15 minutes
  - 2nd Side: Dwell Time: 25 - 35 minutes
- For Double-Sided (Conveyorized or Batch Oven)
- Dwell Time: 25 - 50 minutes

EXPOSURE

PSR-9000A02 Series requires UV exposure to define dams and features. The spectral sensitivity of **PSR-9000A02 Series** 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-9000A02 Series**.

- Exposure Unit: 5 kW or higher
- Stouffer Step 21: Clear 10 minimum (on metal / under phototool)
- Energy: 300 mJ / cm^2 (under phototool)

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DEVELOPMENT

PSR-9000A02 Series 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 - 105°F (29 - 41°C)
- Spray Pressure: 25 - 45 psi
- Dwell Time in developing chamber: 45 - 90 seconds
- Water rinse is needed to remove developer solution followed by a drying step

FINAL CURE **PSR-9000A02** needs to be thermally cured 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

For Process Optimization please contact your local Taiyo America Representative

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FINAL PROPERTIES FOR PSR-9000A02

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

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Visual	3.4.8	Uniform in Appearance	Pass
Curing	3.4.5	Ref: 3.6.1.1, 3.7.1 and 3.7.2	Pass
Non-Nutrient	3.4.6	Does not contribute to biological growth	Pass
Dimensional	3.4.10	No Solder Pickup and Withstand 500 VDC	Pass
Pencil Hardness	3.5.1	Minimum "F"	Pass – 5H
Adhesion	3.5.2	Rigid – Cu, Ni, FR-4	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
Dielectric Strength	3.8.1	500 VDC / mil Minimum	3500 VDC/mil
Thermal Shock	3.9.3	No Blistering, Crazing or De-lamination	Pass

Specific Class "H" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Insulation Resistance	3.8.2		
Before Soldering		5×10^8 ohms minimum	Pass (1.95×10^{12} ohms)
After Soldering		5×10^8 ohms minimum	Pass (5.6×10^{11} ohms)
Moisture & Insulation Resistance	3.9.1		
Before Soldering–In Chamber		5×10^8 ohms minimum	Pass (6.9×10^9 ohms)
Before Soldering–Out of Chamber		5×10^8 ohms minimum	Pass (1.9×10^{12} ohms)
After Soldering-In Chamber		5×10^8 ohms minimum	Pass (5.0×10^9 ohms)
After Soldering-Out of Chamber		5×10^8 ohms minimum	Pass (2.5×10^{12} ohms)
Electrochemical Migration	3.9.2	$>2.0 \times 10^6$ ohms, no dendritic growth	Pass (2.8×10^{12} ohms)

Specific Class "T" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Insulation Resistance	3.8.2		
Before Soldering		5×10^8 ohms minimum	Pass (4.6×10^{11} ohms)
After Soldering		5×10^8 ohms minimum	Pass (2.8×10^{12} ohms)

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FINAL PROPERTIES FOR PSR-9000A02

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 (1.4×10^9 ohms)
Before Soldering–Out of Chamber		5×10^8 ohms minimum	Pass (1.4×10^{11}ohms)
After Soldering-In Chamber		5×10^8 ohms minimum	Pass (1.2×10^9ohms)
After Soldering-Out of Chamber		5×10^8 ohms minimum	Pass (3.6×10^{12}ohms)
Electrochemical Migration	3.9.2	< 1 decade drop, no dendritic growth	Pass

Additional Tests / Results

TEST	REQUIREMENT	RESULT
Dielectric Constant	Internal Test at 1 MHz	3.1
Dissipation Factor	Internal Test at 1 MHz	0.0300
Electroless Nickel / Immersion Gold Resistance	Nickel (85C/30 min) Tape Test Adhesion	Pass
Solvent Resistance Acetone:	No attack – 24 hours	Pass
MEK:	No attack – 24 hours	Pass
IPA:	No attack – 24 hours	Pass
PMA:	No attack – 24 hours	Pass
Acid Resistance HCl – 10%:	No attack – 30 Minutes	Pass
H_2SO_4 – 10%:	No attack – 30 Minutes	Pass
Base Resistance NaOH – 10%:	No attack – 30 Minutes	Pass
Boiling Water Resistance:	No attack – 15 Minutes	Pass
Solder / Flux Resistance (Alphametals)		
Alpha 857 water soluble:	No attack – 1 x 10 sec float (260C)	Pass
NR060 no-clean:	No attack – 1 x 10 sec float (260C)	Pass
3355-NB rosin-based:	No attack – 1 x 10 sec float (260C)	Pass
NR-3000A4 no-clean:	No attack – 1 x 10 sec float (260C)	Pass
Solder / Flux Resistance (Multicore)		
X32-10M no-clean:	No attack – 1 x 10 sec float (260C)	Pass
X32-06I no-clean:	No attack – 1 x 10 sec float (260C)	Pass
Solder/Flux Resistance-(Sanwa)SR-270 rosin-based:	No attack – 1 x 10 sec float (260C)	Pass
Conformal Coating Adhesion: Humiseal 1 B31 acrylic:	Crosscut (10/10) after tape	100/100
Humiseal 1A20 urethane:	Crosscut (10/10) after tape	100/100
Dow Corning 3-1753 silicone:	Crosscut (10/10) after tape	100/100
Glue Dot Adhesion – Loctite 3609	Adhesion of Glue Dot to PSR-9000A02	Excellent

Taiyo America, Inc. (TAIYO) warrants its products to be free from defects in materials and workmanship for the specified warranty period **(PSR-9000A02 / CA-90 A02 Warranty period is 6 Months)** provided the customer has, at all times, and 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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