TECHNICAL DATA SHEET

TAIYO AMERICA

PSR-9000 FLX03G LDI

(UL Name: PSR-9000AD / CA-90AD)

LIQUID PHOTOIMAGEABLE SOLDER MASK

- **Designed for Flexible Printed Circuits on LDI equipment**
- **Screen Print Application**
- **Halogen-Free**
- **Compatible with Lead-Free Processing**
- **Fine Dam Resolution**
- **RoHS Compliant**
- **Excellent Resistance to ENIG, Immersion Tin and Immersion Silver**
- **Green Glossy Finish**
- **UL listed as VTM-0 on 2 mil Kapton**

Revised July 15, 2020

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PROCESSING PARAMETERS FOR PSR-9000 FLX03G LDI

PSR-9000 FLX03G LDI is a two-component, glossy green, alkaline developable LPI solder mask products for flood screen printing. **PSR-9000 FLX03G LDI** has been specifically designed for flexible printed circuit boards and is user friendly with wide processing latitude. **PSR-9000 FLX03G LDI** has very good resistance to ENIG, Immersion Tin and Immersion Silver. All Taiyo America products comply with the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment.

PSR-9000 FLX03G LDI COMPONENTS

	PSR-9000 FLX03G LDI	CA-90 FLX03G LDI
Mixing Ratio	74 parts	26 parts
Color	Green	White

Mixed Properties

Solids	73%
Viscosity	180ps
Specific Gravity	1.14

MIXING

PSR-9000 FLX03G LDI has a six month shelf life and is supplied in pre-measured containers with a mix ratio by weight of 74 parts **PSR-9000 FLX03G LDI** and 26 parts **CA-90 FLX03G LDI. PSR-9000 FLX03G LDI** 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.

Pot life after mixing is 24 hours when stored in a dark place at < 25°C (77°F).

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-9000 FLX03G LDI**. 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: 100-150
- Screen Mesh Angle: 22.5° Bias
- Screen Tension: 20 - 28 Newtons
- Squeegee: 60 – 80 durometer
- Squeegee Angle: 27 – 35°
- Printing Mode: Flood / Print / Print
- Flood Pressure: 20 – 30 psi
- 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 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 conditions for **PSR-9000 FLX03G LDI** are as follows:

- Oven Temperature: 174 - 180°F (79 - 82°C)
- For Single-Sided (Batch Oven)
  - 1st Side: Dwell Time: 15 - 20 minutes
  - 2nd Side: Dwell Time: 20 - 35 minutes
- For Double-Sided (Conveyorized or Batch Oven)
- Dwell Time: 35 - 55 minutes

Exposure

PSR-9000 FLX03G LDI requires UV exposure to define solder mask dams and features. The spectral sensitivity of **PSR-9000 FLX03G LDI** is in the area of 355 - 365 nm. Below are guidelines for exposing **PSR-9000 FLX03G LDI.**

LDI Exposure Unit
- Exposure Unit: Orbotech 8k Series or above
- Stouffer Step 21: Clear 8 minimum (on metal)
- Energy: 100 mJ/cm^2 minimum
- Hold time prior to development: 10 minutes

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DEVELOPMENT

PSR-9000 FLX03G LDI 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 minimum
- Temperature: 85 - 90°F (29 - 32°C)
- Spray Pressure: 25 - 35 psi
- Dwell Time in developing chamber: 60 - 90 seconds
- Water rinse is needed to remove developer solution & dry

FINAL CURE

PSR-9000 FLX03G LDI requires a thermal cure to insure optimal final property performance. Thermal curing can be done in a batch oven or conveyorized oven.

- Temperature: 302°F (150°C)
- Time at Temperature: 60 minutes

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-9000 FLX03G LDI / CA-90 FLX03G LDI Warranty period is 6 Months)** provided the customer has, at all times, stored the ink in a dark place at a temperature of below 68°F (20°C). 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-9000 FLX03G LDI

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 – 3H
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	6100 VDC/mil
Thermal Shock	3.9.3	No Blistering, Crazing or De-lamination	Pass

Specific Class “H” Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Flammability	3.6.3.1	UL 94V-0	Pass – File #E166421
Insulation Resistance	3.8.2		
Before Soldering		5×10^8 Ω minimum	1.11×10^{10} Ω
After Soldering		5×10^8 Ω minimum	2.45×10^{10} Ω
Moisture & Insulation Resistance	3.9.1		
Before Soldering–In Chamber		5×10^8 ohms minimum	2.31×10^{12} Ω
Before Soldering–Out of Chamber		5×10^8 ohms minimum	3.47×10^{13} Ω
After Soldering-In Chamber		5×10^8 ohms minimum	2.45×10^{13} Ω
After Soldering-Out of Chamber		5×10^8 ohms minimum	3.66×10^{13} Ω
Electrochemical Migration	3.9.2	>2.0×10^6 ohms, no dendritic growth	Pass

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Specific Class "T" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Flammability	3.6.3.2	Bellcore 0_2 Index – 28 minimum	Pass
Insulation Resistance Before Soldering After Soldering	3.8.2	 5 x 10^8 ohms minimum 5 x 10^8 ohms minimum	 5.45 x 10^{10} Ω 5.38 x 10^{10} Ω

Specific Class "T" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Moisture & Insulation Resistance Before Soldering–In Chamber Before Soldering–Out of Chamber After Soldering-In Chamber After Soldering-Out of Chamber	3.9.1	 5 x 10^8 ohms minimum 5 x 10^8 ohms minimum 5 x 10^8 ohms minimum 5 x 10^8 ohms minimum	 4.01 x 10^{12} Ω 2.49 x 10^{13} Ω 1.41 x 10^{13} Ω 3.20 x 10^{13} Ω
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/10sec., 3 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
Bendability	TAIYO Internal Test Method 1/8" mandrel (No Cracks)- 10 times	Pass
Halogen Content	Halogen-Free if < 900 ppm	Pass
Tg	TMA Method	55°C
Young's Modulus	DMA Method	2.2 – 2.4 GPa
Tensile Strength	DMA Method	50 – 55 MPa
Elongation (%)	DMA Method	1.5 – 2.0%

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