

PSR-9000 FXT EU /CA-90 FXT EU

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

LIQUID PHOTOIMAGEABLE SOLDER MASK

-  **Designed for Flexible Printed Circuit Boards**
-  **Screen Print Application**
-  **SVHC-Free**
-  **Halogen-Free**
-  **Compatible with Lead-Free Processing**
-  **Fine Dam Resolution**
-  **RoHS Compliant**
-  **Excellent Resistance to ENIG, Immersion
Tin and Immersion Silver**
-  **Green Finish**
-  **Low Warpage**

PROCESSING PARAMETERS FOR PSR-9000 FXT EU

PSR-9000 FXT EU is a two-component, Green alkaline developable LPI solder mask products for flood screen printing. **PSR-9000 FXT EU** has been specifically designed for flexible printed circuit boards and is user friendly with wide processing latitude. **PSR-9000 FXT EU** 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 FXT EU** meets the IPC-SM-840 requirement for class FH and FT.

PSR-9000 FXT EU	C O M P O N E N T S	PSR-9000 FXT EU	/	CA -90 FXT EU
		Mixing Ratio:	75 parts	25 parts
		Color:	Green	White
		<u>Mixed Properties</u>		
		Solids	74%	
		Viscosity	140 - 180ps	
		Specific Gravity	1.2	

MIXING	PSR-9000 FXT EU has a nine-month shelf life and is supplied in pre-measured containers with a mix ratio by weight of 75 parts PSR-9000 FXT EU and 25 parts CA-90 FXT EU in an aluminum bag. Squeeze the CA-90 FXT EU out of the aluminum bag into the container of PSR-9000 FXT EU. PSR-9000 FXT EU 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 48 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 these methods will provide a clean surface for the application of PSR-9000 FXT EU. Hold time after cleaning the printed circuit board should be held to a minimum to reduce the oxidation of the copper surfaces.
---------------------	---

SCREEN PRINTING	Method: Single Sided and Double Sided Screening • Screen Mesh: 92-205 tpi with a 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
------------------------	---

PROCESSING PARAMETERS FOR PSR-9000 FXT EU

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 FXT EU are as follows: • Oven Temperature: 79 – 82°C (174 – 180°F) • 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 FXT EU requires UV exposure to define solder mask dams and features. The spectral sensitivity of PSR-9000 FXT EU 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-9000 FXT EU. • Exposure Unit: 7 kW or higher • Stouffer Step 21: Clear 10 minimum (on metal / under phototool) • Energy: ○ Green ▪ 300 - 400mJ / cm² minimum (under phototool)
DEVELOPMENT	PSR-9000 FXT EU 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 , to 11.2 • Temperature: 30 – 32°C (85 – 90°F) • Spray Pressure: 25 - 35 psi • Dwell Time in developing chamber: 45 - 70 seconds • Water rinse is needed to remove developer solution & dry
FINAL CURE	PSR-9000 FXT EU requires a thermal cure to insure optimal final property performance. Thermal curing can be done in a batch oven or conveyorized oven. • Temperature: 135 – 149°C (275 – 300°F) • Time at Temperature: 55 – 70 minutes

For Process Optimization please contact your local Taiyo America Representative

FINAL PROPERTIES FOR PSR-9000 FXT EU

IPC-SM-840E, Class FH & FT, 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"	4H
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	5400 VDC/mil
Thermal Shock	3.9.3	No Blistering, Cracking or De-lamination	Pass

Specific Class "FH" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Insulation Resistance Before Soldering After Soldering	3.8.2	5 x 10 ⁸ ohms minimum 5 x 10 ⁸ ohms minimum	Pass (1.72 x 10 ¹² ohms) Pass (1.52 x 10 ¹³ ohms)
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	Pass (9.82 x 10 ⁹ ohms) Pass (6.75 x 10 ¹² ohms) Pass (1.07 x 10 ¹⁰ ohms) Pass (2.87 x 10 ¹² ohms)
Electrochemical Migration	3.9.2	>2.0 x 10 ⁶ ohms, no dendritic growth	Pass (1.62 x 10 ¹² ohms)

Specific Class "FT" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Insulation Resistance Before Soldering After Soldering	3.8.2	5 x 10 ⁸ ohms minimum 5 x 10 ⁸ ohms minimum	Pass (8.13 x 10 ¹² ohms) Pass (1.53 x 10 ¹² ohms)

TECHNICAL DATA SHEET



FINAL PROPERTIES FOR PSR-9000 FXT EU

Specific Class “FT” Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Moisture & Insulation Resistance	3.9.1		
Before Soldering-In Chamber		5 x 10 ⁸ ohms minimum	Pass (5.32 x 10 ⁸ ohms)
Before Soldering-Out of Chamber		5 x 10 ⁸ ohms minimum	Pass (2.92 x 10 ¹² ohms)
After Soldering-In Chamber		5 x 10 ⁸ ohms minimum	Pass (1.23 x 10 ⁹ ohms)
After Soldering-Out of Chamber		5 x 10 ⁸ ohms minimum	Pass (2.33 x 10 ¹² ohms)
Electrochemical Migration	3.9.2	< 1 decade drop, no dendritic growth	Pass

Additional Tests / Results

TEST		REQUIREMENT	RESULT
Young's Modulus (GPa)		Internal Test	2.4
Tensile Strength (MPa)		Internal Test	46
Elongation (%)		Internal Test	3.1
Tg (DMS)		Internal Test	80.2°C
Warpage (mm)		25 µm PI 50 µm PI	1.9 1.1
Electroless Nickel / Immersion Gold Resistance		Atotech ENIG – Tape Test Adhesion	Pass
Immersion Tin Resistance		Florida Cirtech Tin – Tape Test Adhesion	Pass
Immersion Silver Resistance		MacDermid Silver – 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 ₂ SO 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-(MEC) SR-270 rosin-based:		No attack – 2 x 10 sec float (290C)	Pass
Solder/Flux Resistance-(Sanwa) SR-27C rosin-based:		No attack – 2 x 10 sec float (290C)	Pass
Flexibility after Exposure:		Crease Test (No Cracks) – 10 times	Pass
Flexibility after Thermal Cure:		1/8" mandrel (No Cracks) – 10 bends	Pass
Flexibility after Thermal Cure:		IPC Test	Pass

Taiyo America, Inc. (TAIYO) warrants its products to be free from defects in materials and workmanship for the specified warranty period (**PSR-9000 FXT EU Warranty period is 2 months; CA-90 FXT EU Warranty period is 6 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.