

PSR-4000 AUS703

LIQUID PHOTOIMAGEABLE SOLDER MASK

- ④ **Designed for Flip Chip Packaging Applications**
- ④ **Halogen-Free (300ppm)**
- ④ **Excellent Thermal and Crack Resistance**
- ④ **Low Water Absorption**
- ④ **RoHS Compliant**
- ④ **Excellent Resistance to Electroless and Electrolytic Gold Plating**
- ④ **Compatible with Lead-Free Processing**
- ④ **Fine Dam Registration**

PROCESSING PARAMETERS FOR PSR-4000 AUS703

PSR-4000 AUS703 is a two-component, epoxy, liquid photoimageable solder mask that is green in color and halogen-free. **PSR-4000 AUS703** has been specifically designed for Flip Chip(FC) Packages and develops in an aqueous alkaline solution. **PSR-4000 AUS703** has excellent cracking and PCT resistance, adhesion to molding compounds, and resistance to electrolytic and electroless Gold plating. **PSR-4000 AUS703** can be processed using standard screen-printing equipment. **PSR-4000 AUS703** has a UL flammability rating of 94V-0. 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-4000 AUS703 COMPONENTS

PSR-4000 AUS703 / CA-40 AUS703

Mixing Ratio	70 parts	30 parts
Color	Green	White

Mixed Properties

Solids	75%
Viscosity	210 – 230 ps
Specific Gravity	1.2

MIXING

PSR-4000 AUS703 is supplied in pre-measured containers with a mix ratio by weight of 70 parts **PSR-4000 AUS703** and 30 parts **CA-40 AUS703**. **PSR-4000 AUS703** 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-4000 AUS703**. Hold time after cleaning the printed circuit board should be held to a minimum to reduce the oxidation of the copper surfaces.

PROCESSING PARAMETERS FOR PSR-4000 AUS703

- SCREEN PRINTING** Method: Single Sided and Double Sided Screening
- Screen Mesh: 86 – 110
 - Screen Mesh Angle: 22.5° Bias
 - Screen Tension: 20 - 28 Newtons
 - Squeegee: 60 – 80 durometer
 - Squeegee Angle: 27 – 35°

The appropriate coating thickness on copper circuits after cure is 10 – 20 microns. Coating less than said may cause lower resistivity in solder heat, chemical and Ni/Au plating, thicker may cause undercut and insufficient tackiness

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-4000 AUS703** are as follows:

- Hold Time after Screen Printing: 10 minutes
 - Oven Temperature: 176 - 180°F (80 - 82°C)
 - For Single-Sided (Batch Oven)
 - 1st Side: Dwell Time: 15 - 20 minutes
 - 2nd Side: Dwell Time: 20 - 30 minutes
 - For Double-Sided (Conveyorized or Batch Oven)
 - Dwell Time: 20 – 30 minutes
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EXPOSURE **PSR-4000 AUS703** requires UV exposure to define solder mask dams and features. The spectral sensitivity of **PSR-4000 AUS703** 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 AUS703**.

- Exposure Unit: 7 kW or higher
- Stouffer Step 21: Clear 10 minimum (on metal / under phototool)
- Energy: Minimum 500 mJ / cm² (under phototool)

PROCESSING PARAMETERS FOR PSR-4000 AUS703

DEVELOPMENT **PSR-4000 AUS703** 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 - 90°F (29 - 32°C)
- Spray Pressure: 25 - 35 psi
- Dwell Time in developing chamber: 45 - 60 seconds
- Water rinse is needed to remove developer solution & dry
- Water Rinse Temperature: 77°F or below (25°C or below)
- Water Rinse Time: 45 – 60 seconds

FINAL CURE **PSR-4000 AUS703** 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

If legend ink is to be applied, final cure should be set for 30 minutes prior to legend ink then a post cure of 30 minutes after legend ink application.

UV CURE **PSR-4000 AUS703** also requires a UV cure to insure optimal final property performance. The recommended process for UV curing is as follows:

- UV Energy: 500 – 1000 mJ / cm²
 - Lamps: High Pressure Mercury Lamps
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For Process Optimization please contact your local Taiyo America Representative

FINAL PROPERTIES FOR PSR-4000 AUS703

TEST	REQUIREMENT	RESULT	
Adhesion	Internal Test: Cross hatch peeling	100/100	
Pencil Hardness	Internal Test: No scratch on Copper	3H	
Solder Heat Resistance	Fosin Flux 260°C/10sec, 3 cycles	Pass	
Dielectric Constant	Internal Test at:	1 MHz: 4.0 1 GHz: 3.8 5 GHz: 3.6 10 GHz: 3.3	
Dielectric Constant	Internal Test: @ 1 MHz 25 - 65°C / 90% RH / 7 Days	Initial: 4.0 Final: 4.3	
Dissipation Factor	Internal Test at:	1 MHz: 0.0260 1 GHz: 0.0260 5 GHz: 0.0270	
Dissipation Factor	Internal Test @ 1 MHz 25 - 65°C / 90% RH / 7 Days	Initial: 0.026 Final: 0.031	
Insulation Resistance	IPC Comb type (B-pattern) Humidification: 25-65°C / 90%RH / DC100V for 7 Days Measurement: DC500V for 1 min @ RT	Initial 1.3 X 10 ¹³ Ω Conditioned 7.8 X 10 ¹¹ Ω	
Tg/CTE	Internal Test TMA Method	Tg - 105°C Below Tg - 55ppm Above Tg- 140ppm	
Electroless Gold Plating Resistance	5 microns Nickel / 1 microns Gold	No Peeling	
Electrolytic Gold Plating Resistance	3 microns Nickel / .03 microns Gold	No Peeling	
Solvent Resistance	Acetone: MEK: IPA: PMA: PGM-Ac:	No attack – 24 hours No attack – 24 hours No attack – 24 hours No attack – 24 hours No attack – 20°C for 30 minutes	Pass Pass Pass Pass Pass
Acid Resistance	Cl – 10%: H ₂ SO ₄ – 10%:	No attack – 30 Minutes No attack – 30 Minutes	Pass Pass
Base Resistance	NaOH – 10%:	No attack – 30 Minutes	Pass
	Boiling Water Resistance:	No attack – 15 Minutes	Pass
P.C.T	Internal Test: 121°C for 50 hours	Pass	

Taiyo America, Inc. (TAIYO) warrants its products to be free from defects in materials and workmanship for the specified warranty period (**PSR-4000 AUS703 / CA-40 AUS703 Warranty period is 3 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.