









PSR-4100WL (HD)

LIQUID PHOTOIMAGEABLE LEGEND INK

-  **Screen or Spray Application**
-  **White Color Finish**
-  **RoHS Compliant**
-  **Excellent Resolution Capabilities**
-  **Wide Process Window**
-  **Excellent Heat Resistance in HASL**
-  **Compatible with Lead-Free Processing**
-  **Low Odor**

PROCESSING PARAMETERS FOR PSR-4100WL (HD)

PSR-4100 WL (HD) is a two-component, alkaline developable LPI legend ink for flood screen and spray application methods. The products is designed to be user friendly with wide processing latitudes, low odor, fast developing and good resistance to alternate metal finishes such as ENIG and immersion Tin. **PSR-4100 WL (HD)** has excellent resolution capabilities. **PSR-4100 WL (HD)** meets the performance requirements of A-A-56032 as it applies to printed circuit board applications and to IPC-4781. 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-4100WL (HD) COMPONENTS	PSR-4100WL (HD) / CA-41WL (HD)	
	Mixing Ratio	70 parts
Color	White	White

MIXING **PSR-4100WL (HD)** is supplied in pre-measured containers with a mix ratio by weight of 70 parts **PSR-4100WL (HD)** and 30 parts **CA-41WL (HD)**. **PSR-4100WL (HD)** 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 $\leq 25^{\circ}\text{C}$ (77°F).

PRE-CLEANING Prior to legend ink application, the surface needs to be free of contaminates. Our recommendation is to apply the legend ink on the circuit board after developing the solder mask. If the legend ink is applied after solder mask final cure, the surface needs to be cleaned chemically to make sure there are no contaminates on the surface. It is not a good idea to mechanically scrub the solder mask prior to applying the legend ink.

SCREEN PRINTING Method: Single Sided and Double Sided Screening

- Screen Mesh: 230 – 355
- Screen Mesh Angle: 22.5° Bias
- Screen Tension: 20 - 28 Newtons
- Squeegee: 60 – 80 durometer
- Squeegee Angle: $27 - 35^{\circ}$
- Printing Mode: Flood / Print
- Flood Pressure: 20 – 30 psi
- Printing Speed: 2.0 – 9.9 inches/sec
- Printing Pressure: 60 – 100 psi

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TACK DRY CYCLE The Tack Dry step is required to remove solvent 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 from the surface. Insufficient tack dry will result in artwork marking and/or sticking. Typical tack dry conditions for **PSR-4100WL (HD)** are as follows:

- Oven Temperature: 160 - 180°F (71 - 82°C)
 - For Single-Sided (Batch Oven)
 - 1st Side: Dwell Time: 10 - 20 minutes
 - 2nd Side: Dwell Time: 15 - 20 minutes
 - For Double-Sided (Conveyorized or Batch Oven)
 - Dwell Time: 15 - 40 minutes
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EXPOSURE **PSR-4100WL (HD)** requires UV exposure to define solder mask dams and features. The spectral sensitivity of **PSR-4100WL (HD)** 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-4100WL (HD)**.

- Exposure Unit: 5 kW or higher
 - Stouffer Step 21: Clear 8 (on metal / under phototool)
 - Energy: 200 mJ / cm² minimum (under phototool)
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DEVELOPMENT **PSR-4100WL (HD)** 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
- Dwell Time in developing chamber: 45 - 90 seconds
- Water rinse is needed to remove developer solution followed by a drying step

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FINAL CURE **PSR-4100WL (HD)** 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
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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-4100WL (HD) / CA-41WL (HD) Warranty period is 9 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.

FINAL PROPERTIES FOR PSR-4100WL (HD)

Test	Test Method / Requirement	Results
Pencil Hardness	Internal Test	6H
Adhesion after Cure	Rigid – Cu, Ni, FR-4	Pass
Adhesion after Soldering	Internal Tape Test	Pass
Resistance to Solder	No Solder Sticking	Pass
Outgassing after a thermal cure of 90 minutes at 300°F plus a 2 J/cm ² UV Cure	NASA Requirements: TML = 1% or less CVCM = 0.10% or less	Pass: TML = 0.87% CVCM = 0.03%

CID-A-A-56032D Performance Requirements

Test	A-A-56032D Paragraph	Requirements	Results
Adhesion	3.7	Cured ink impressions shall not deteriorate when subjected to trichloroethylene vapors at 86.5 to 88C for a period of not less than three minutes and not greater than six minutes.	Pass
Electrical Resistance (Type II) Before Conditioning After Conditioning	3.8	1 x 10 ¹² ohms minimum 1 x 10 ¹⁰ ohms minimum	Pass (2.0 x 10 ¹³ ohms) (7.2 x 10 ¹² ohms)
Abrasion Resistance	3.9.1	Cured ink impressions shall retain their legibility after subjection to 300 to 303 revolutions of the CS-10 abrasive wheel while under a minimum load of 2.2pounds in accordance with ASTM D4060.	Pass (302 revolutions)
Chemical Resistance	3.9.2	Cured Ink impressions shall retain their legibility when immersed for a minimum of 30 minutes in water, denatured ethyl alcohol, and non-ODC (Ozone Depleting Chemical) cleaning solvent.	Pass
Chemical Resistance (Type II)	3.9.2.1	In addition to 3.9.2, Type II cured ink shall be resistant to hot solder and flux.	Pass
Salt Spray Resistance	3.9.3	Cured Ink impressions shall not deteriorate when exposed to a 5 percent salt spray solution at 33 to 37C for a period of not less than 48 hours.	Pass
Light Fastness	3.9.4	Cured ink impressions shall not fade and shall remain legible when tested by a light fastness test. To determine conformance, one half of the surface of the test specimens shall be covered to obscure the light, and the remaining half shall be exposed for 24 hours to the light source outlined in ASTM G153 using daylight filter and exposure cycle 7 or ASTM G155 using window glass filter and exposure cycle 4.	Pass (ASTM G155 using window glass and exposure cycle 4)
Stability	3.9.5	Cured ink impressions shall not fade, chip, peel, or flow and shall remain legible when exposed to a temperature of 118 to +/- 3C for a period of not less than 24 hours.	Pass
Fungus Resistance	3.9.6	Cured ink impressions shall not support fungi growth when inspected.	Pass