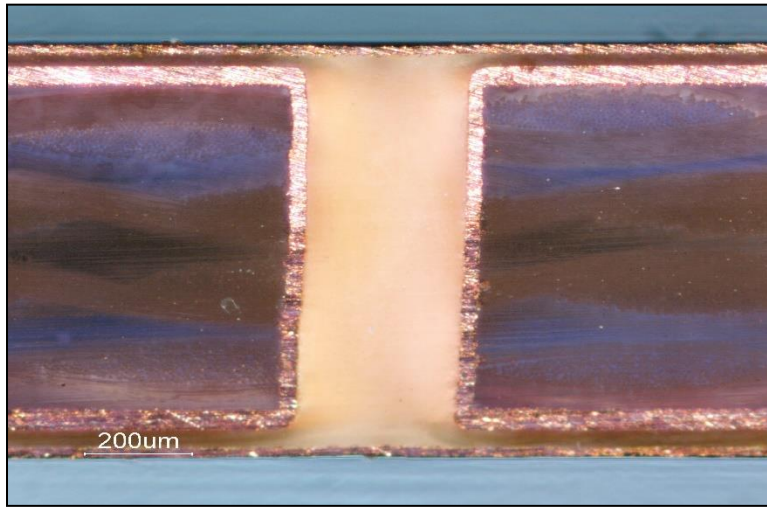


## ***TAIYO THP-100DX1 SP*** ***(UL Name: THP-100DX)***



THP-100DX1 SP after copper plating.

- ④ **Available in a 1 and 5 kg container**
- ④ **One-component Thermally Cured hole fill material**
- ④ **Very Low Shrinkage**
- ④ **SVHC-Free (melamine-free)**
- ④ **RoHS Compliant**
- ④ **Halogen-Free**
- ④ **High PCT and Thermal Resistance**

# TECHNICAL DATA SHEET



## PROCESSING PARAMETERS FOR THP-100DX1 SP

**THP-100DX1 SP** is a single-component, thermally curable, permanent hole-plugging material that is applied by Automatic Filling Equipment with an air-free packaged cartridge or larger container for screen printing application. This product has extremely low shrinkage after cure, which enables the plugging of plated through holes of thick boards. It can be used for board with cover plating feature. This product requires mechanical brushing after cure to remove excess material at the surface of the hole. 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.

**PRODUCT STORAGE**      **THP-100DX1 SP** is supplied in 1-kg or 5-kg containers. It needs to be stored frozen at or below 14°F (-10°C) in accordance to our warranty. Other storage guidelines are listed below:

Storage Temperature	Recommended Maximum Storage Days
Freezer: 14°F (-10°C)	365
Refrigerated: 41°F (5°C)	180
Room Temperature: 68°F (20°C)	30

**PRE-CLEANING**      Prior to hole filling, ensure that the hole is free of oxidation and contaminants and is dry to increase adhesion. A 5-7% sulfuric or hydrochloric acid wash can be used to prepare the surface prior to application. Hold time after cleaning the holes should be held to a minimum to reduce the oxidation of the copper surfaces.

**HOLE FILL APPLICATION**      **THP-100DX1 SP** needs to be at room temperature prior to filling holes. A minimum of 1 hour is need after removing from the freezer.

Method: Screen Printing

**THP-100DX1 SP** can be screened by hand or by automatic equipment. The mesh size should range from 80 – 200 tpi. Use a soft squeegee with high printing pressure and slow printing speed to reduce the amount of air pushed into the hole. A beveled squeegee can also be used with high printing pressure and slow printing speed.

**PRELIMINARY CURE**      The preliminary cure is used to “set up” the **THP-100DX1 SP** for planarization through a scrubber. Recommended conditions for the preliminary cure is:

- Oven Temperature: 125 – 130°C (257 -265°F)
- Dwell Time: 40 – 50 minutes

# TECHNICAL DATA SHEET



## PROCESSING PARAMETERS FOR THP-100DX1 SP

**PLANARIZATION** To remove the excess **THP-100DX1 SP** that is present on the panel a sanding process needs to be performed. The sanding will provide a planar surface for the subsequent plating process. The recommended grit for the planarization process is 320.

**Note:** For customers with automated planarization equipment, it may be possible to eliminate the 'Preliminary Cure' and to fully cure **THP-100DX1 SP** before planarization.

**FINAL CURE** **THP-100DX1 SP** requires a thermal cure to insure optimal final property performance. Thermal curing can be done in a batch oven or conveyORIZED oven.

- Temperature: 150°C (300°F)
- Time at Temperature: 60 minutes

**WARRANTY PERIOD (SHELF LIFE): 12 Months from Production Date if Stored at or below 14°F (-10°C)**

## FINAL PROPERTIES FOR THP-100DX1 SP

Test	Results
Color	Beige
Adhesion crosscut	100/100
Pencil Hardness	7H
Halogen Level	247 ppm
Outgassing by ASTM E 595 (TML <1.0% and CVCM <0.1%)	TML = 0.27% - Pass CVCM = 0.01% - Pass
Dissipation factor measured at 1 MHz, at room temperature, after the humidity cycling of 25 to 65 °C cycles, 90 %RH, 7 days	Initial: 0.02 Conditioned: 0.03
Solder Resistance Rosin Flux, 260°C/20secs/2cycles	Pass
Water Absorption - PCT 120°C/100%RH/12hrs	0.9%
Water Absorption – DI water immersion for 24 hours at 23°C	0.6%
T(g) – TMA Tensile Method	160°C
CTE – TMA Tensile Method ( $\alpha_1/\alpha_2$ )	32/115 ppm
T(g) – TMA Expansion Method	155°C
CTE – TMA Expansion Method ( $\alpha_1/\alpha_2$ )	32/81 ppm
Peel Strength – Vertical direction, 50 mm/min	5 N/cm minimum

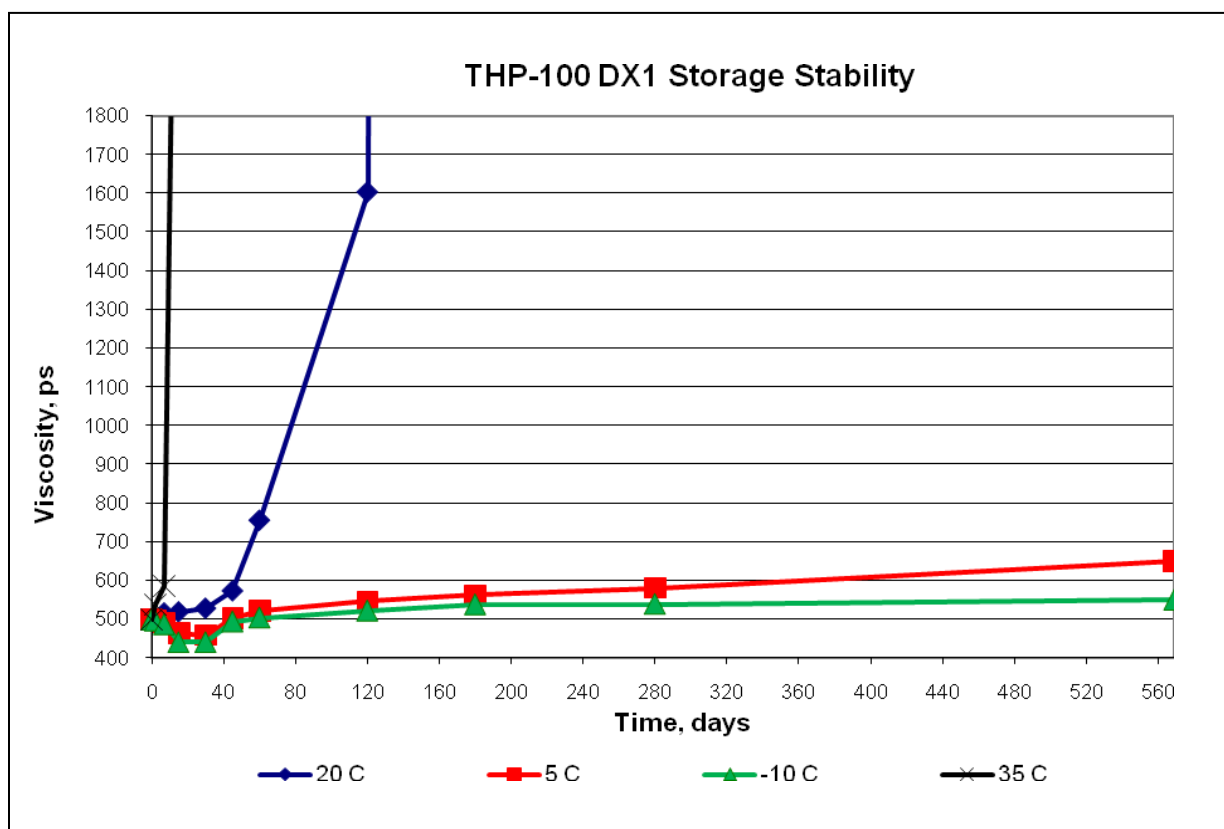
# TECHNICAL DATA SHEET



## STORAGE CONDITION RECOMMENDATIONS

**THP-100DX1 SP** is a highly-reactive, one-part epoxy material and, as such, the viscosity stability is greatly affected by the storage temperature. The table and chart below are intended as a guide to the user, and do not constitute or imply warranty of the product under each condition shown.

Storage Temperature	Shelf Life (Days)
Room Temp. (20°C)	30
Refrigerated (5°C)	180
Frozen (-10°C)	365



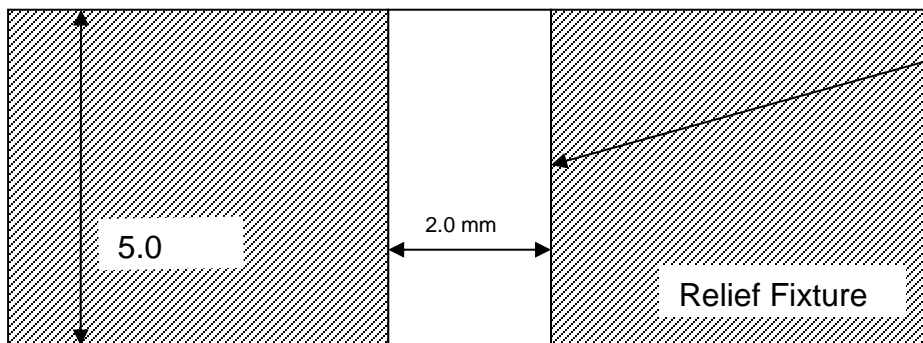
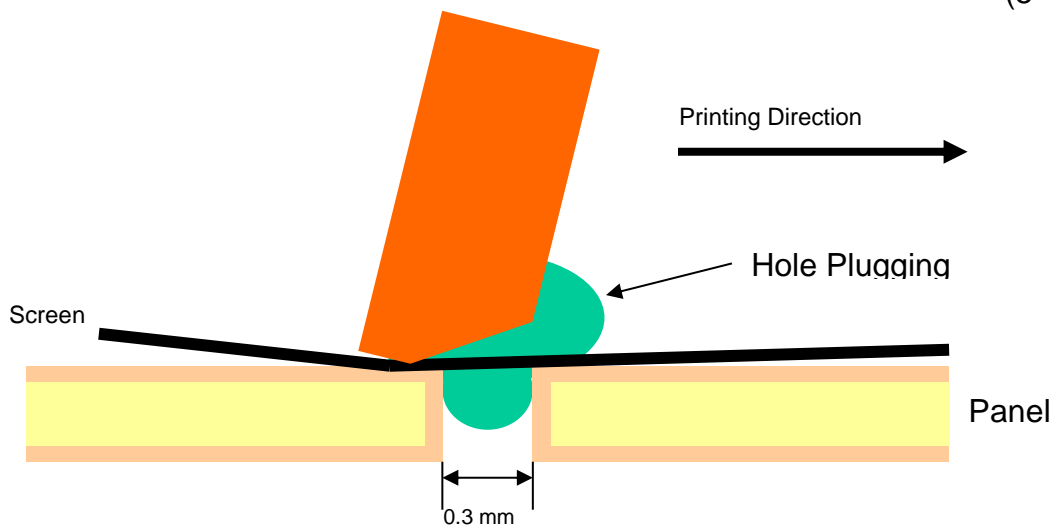
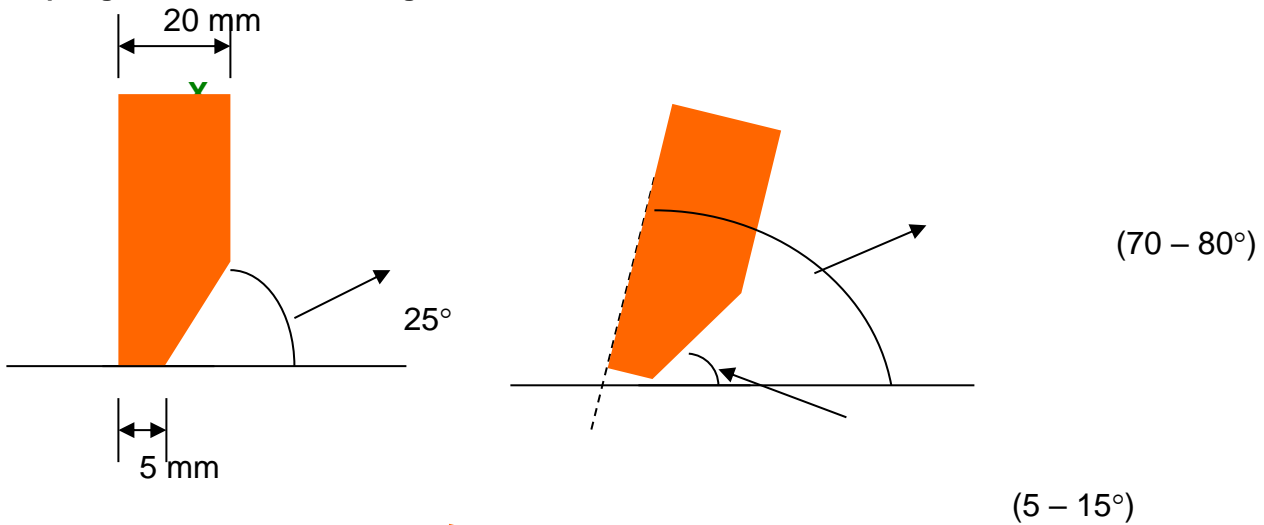
Taiyo America, Inc. (TAIYO) warrants its products to be free from defects in materials and workmanship for the specified warranty period (**THP-100DX1 SP Warranty period is 12 Months**) provided the customer has, at all times, stored the ink at a temperature of 14°F (-10°C) or less. TAIYO accepts no 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.

# TECHNICAL DATA SHEET



## Screen Printing Set Up with Beveled Squeegee

### Squeegee Dimensions and Angle



Relief holes should be drilled through the thickness of the fixture.

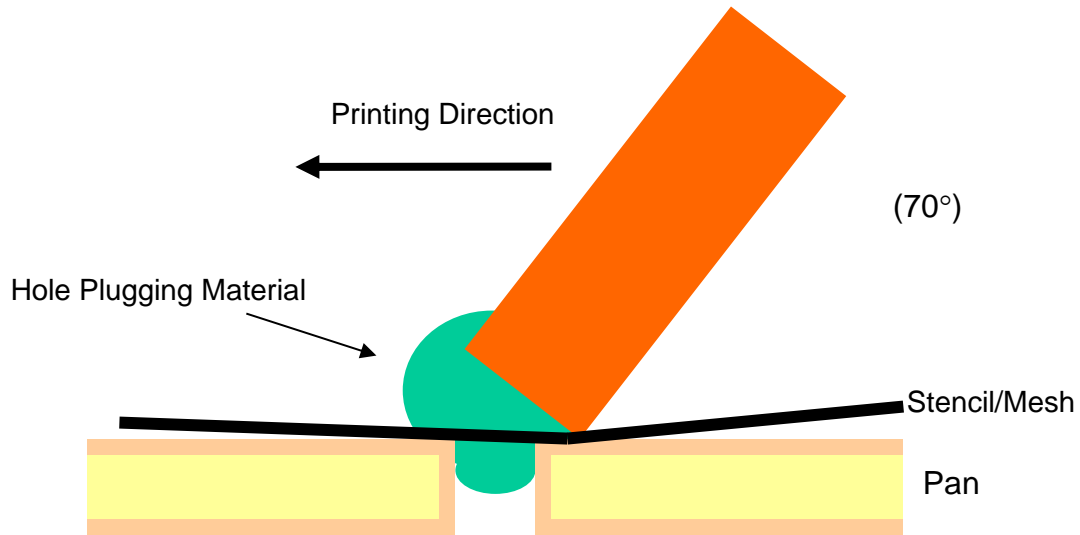
The fixture may be “vented” on the underside by placing a layer of screen mesh between the fixture and the bed or screening table.

# TECHNICAL DATA SHEET

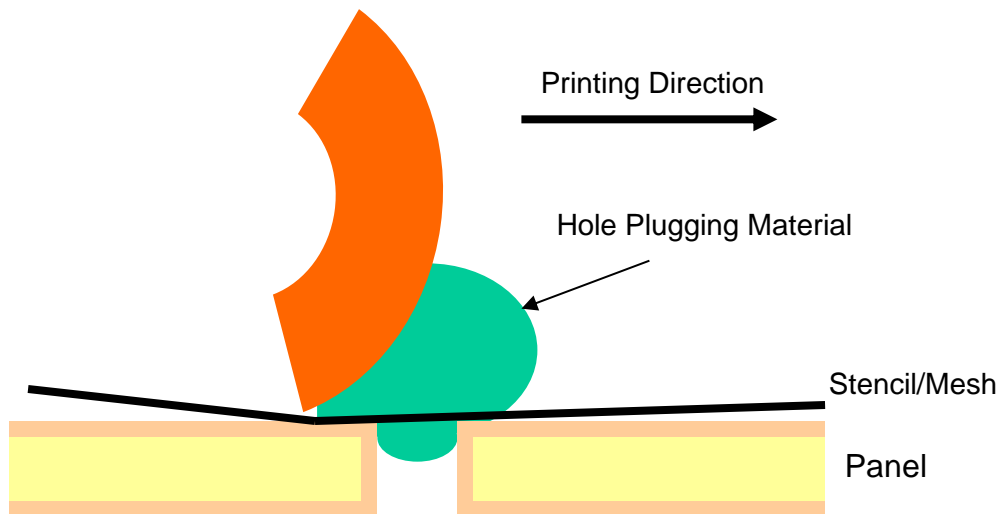


## Screen Print Set Up with Straight Squeegee

### Screen Printing (Pushing Method)





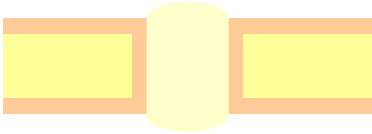
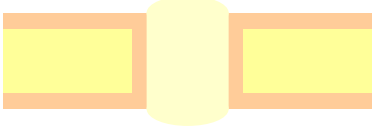
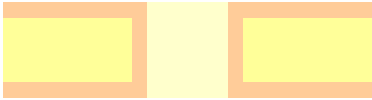

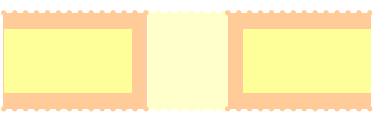
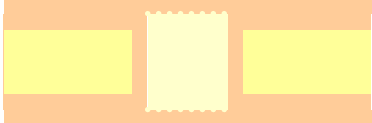
### Screen Printing (Plow Method)



# TECHNICAL DATA SHEET



## Hole Plugging Process for THP-100DX1 SP

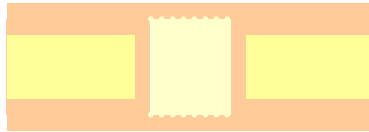
<b>Panel Selection</b>		Plated through hole after copper plating
<b>Surface Treatment</b>		Chemical or Mechanical Scrub with water rinse and dry
<b>Application Method</b>		Screen using squeegee set up and mesh size of 80 – 200
<b>Pre-Cure</b>		Temperature: 130°C (266°F) Time: 45 – 60 minutes
<b>Scrubbing</b>		Buff Scrubbing using #220 - #320 grit
<b>Final Cure</b>		Temperature: 150°C (300°F) Time: 60 minutes
<b>Micro Etching</b>		Prepare surface of copper and hole plug material for copper plating
<b>Electroless Copper</b>		Plate copper over hole plug and build up copper thickness

# TECHNICAL DATA SHEET



## Hole Plugging Process for THP-100DX1 SP (continued)

**Annealing**



Temperature: 100°C (212°F)  
Time: 30 minutes

**Electrolytic  
Copper Plating**



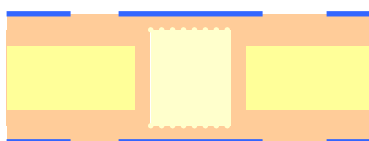
Build up copper thickness to desired level

**Baking**



Temperature: 150°C (300°F)  
Time: 60 minutes

**Etch Resist**



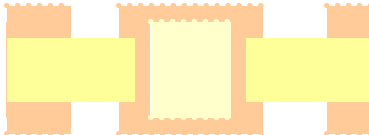
Coat surface with etch resist to designs  
copper pads and traces

**Etching/Stripping**



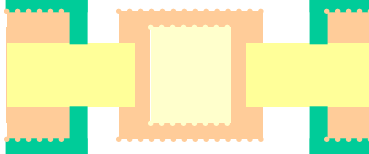
Etch copper then strip etch resist

**Surface Treatment**



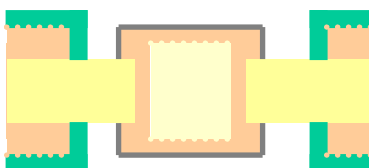
Clean surface for solder mask application

**Solder Mask**



Coat with Solder Mask. See Taiyo for solder mask  
choices.

**Copper Protection**



Protect copper with metal plating such as Ni/Au,  
Ag, and Sn or by HASL or OSP.