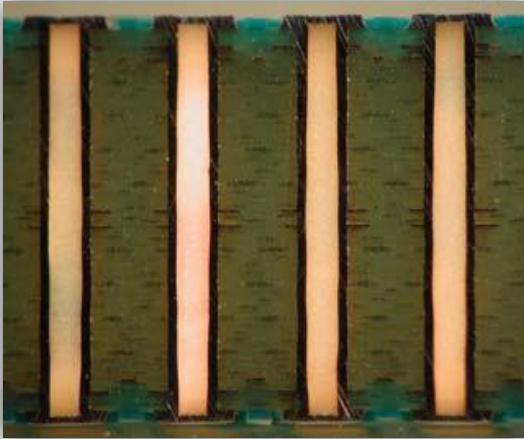


THP-100DX1 Series

- ④ **Designed specifically for hole filling equipment to fill small vias without voids**
- ④ **Available in cartridges and 1 Kg cans**
- ④ **THP-100DX1 (HTG) has a High Tg (173°C) and low CTE (19/56ppm)**
- ④ **Very Low Shrinkage and Ease of Planarization**
- ④ **No Chemical Attack through Desmear**
- ④ **Halogen Free and RoHS Compliant**
- ④ **High PCT and Thermal Resistance**
- ④ **THP-100DX1 (HTG) has a 1-year shelf life at 5°C**
- ④ **THP-100DX1 VF and VF (HV) have a 1 year shelf life at -10°C**

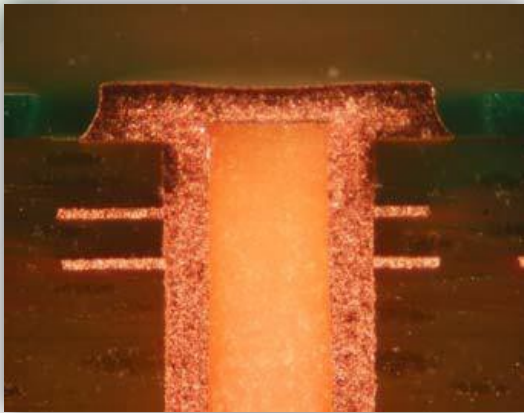
THP-100DX1 SERIES



Board Thickness = 120 mils
Hole Diameter = 14 mils



THP-100DX1 Series in 0.5 kg cartridges and 1 kg containers



THP-100DX1 Series products are single-component, thermally curable, permanent hole filling materials that are applied by Hole Filling Equipment. They are available in packaged cartridges or larger containers. These products have extremely low shrinkage after cure, which enables the filling of plated through holes in thick boards. THP-100DX1 products work well in applications 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.

TECHNICAL DATA SHEET



PRODUCT STORAGE

THP-100DX1 Series products are supplied in cartridges or larger 1 kg containers.

THP-100DX1 VF & THP-100DX1 VF(HV) versions need to be stored frozen at or below 14°F (-10°C) to maintain a 1-year shelf life. THP-100DX1 (HTG) needs to be stored frozen, or at or below 41°F (5°C) to maintain a 1-year shelf life.

Other storage guidelines are listed below:

| Storage Temperature | Maximum Storage | |
|-------------------------------|-----------------------------------|------------------|
| | THP-100DX1 VF & THP-100DX1 VF(HV) | THP-100DX1 (HTG) |
| Freezer: 14°F (-10°C) | 365 days | 365 days |
| Refrigerated: 41°F (5°C) | 180 days | 365 days |
| Room Temperature: 68°F (20°C) | 30 days | 30 days |

PRE-CLEANING

Prior to via filling, ensure that the vias are free of contaminants and oxidation 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 vias should be held to a minimum to reduce the oxidation of the copper surfaces.

VIA FILL APPLICATION

The THP-100DX1 Series products need to be at room temperature prior to filling holes. A minimum of 1 hour is needed after removing from the freezer.

Method: Hole Filling Equipment

These products were specifically designed for via filling equipment to fill small vias with no voids. The following chart has guidelines for filling holes.

After filling the vias, the scavenger is used to remove excess via filling material from the panel.

| Board Thickness | 39 mils | 62 mils | 93 mils | 120 mils |
|------------------------------|---------|---------|---------|----------|
| Head Pressure (psi) | 30-50 | 30-50 | 30-50 | 30-50 |
| Past Pressure (psi) | 15-30 | 15-30 | 15-30 | 15-30 |
| Traverse Speed Down (%) | 10-20 | 5-15 | 3-10 | 2-8 |
| Traverse Speed Down (mm/min) | 190-230 | 140-215 | 90-165 | 75-115 |
| Delay Time for Fill (sec) | 4-10 | 4-10 | 4-10 | 4-10 |

TECHNICAL DATA SHEET



OPTION 1

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

- Oven Temperature: 125 – 130°C (257 -265°F)
- Dwell Time: 40 – 70 minutes

PLANARIZATION To remove the excess **THP-100DX1** 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** before planarization.

FINAL CURE **THP-100DX1** 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

OPTION 2

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

- Oven Temperature: 125 – 130°C (257 -265°F)
- Dwell Time: 40 – 70 minutes

FINAL CURE **THP-100DX1** 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

PLANARIZATION To remove the excess **THP-100DX1** 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** before planarization.

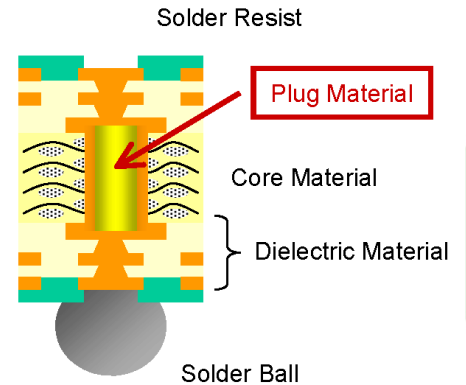
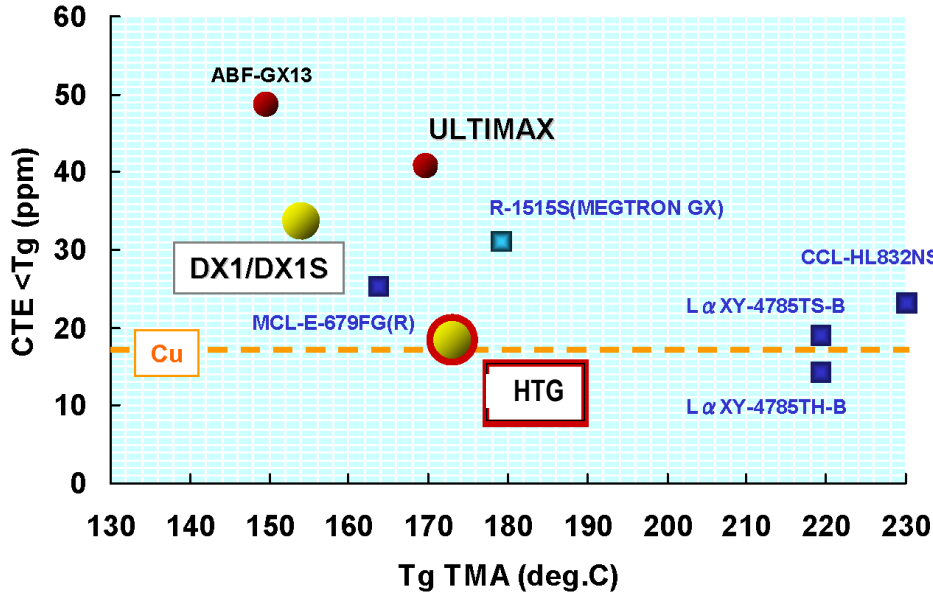
TECHNICAL DATA SHEET






FINAL PROPERTIES FOR THP-100DX1 SERIES

| TEST | RESULTS | |
|--|---|---|
| | THP-100DX1 VF & THP-100DX1 VF(HV) | THP-100DX1 (HTG) |
| Color | Beige | White |
| Density | 1.64 g/cm ³ | 1.97 g/cm ³ |
| Adhesion cross cut | 100/100 | 100/100 |
| Pencil Hardness | 7H | 8H |
| Dissipation factor measured at 1 MHz, at room temperature, after humidity cycling of 25 to 65°C cycles, 90% RH, 7 days | Initial: 0.02 Conditioned: 0.03 | Initial:0.02 Conditioned:0.03 |
| Solder Resistance Rosin Flux, 260°C/20secs/2cycles | Pass | Pass |
| Water Absorption - PCT 120°C/100%RH/12hrs | 0.9% | 0.9% |
| Water Absorption – DI water immersion for 24 hours at 23°C | 0.6% | 0.7% |
| Young's Modulus | 4.5 GPa | 4.5 GPa |
| Tensile Strength | 40 MPa | 40 MPa |
| Elongation | 1.5% | 1.5% |
| Poisson Ratio | 0.34 | 0.34 |
| T(g) – TMA Tensile Method | 160°C | 173°C |
| CTE – TMA Tensile Method (α_1/α_2) | 32/115 ppm | 19/56 ppm |
| T(g) – TMA Expansion Method | 155°C | 170°C |
| CTE – TMA Expansion Method (α_1/α_2) | 32/81 ppm | 19/56 ppm |
| Decomposition Temperature | 356°C | 356°C |
| Thermal Conductivity | 0.58 W/mK | 0.71 W/mK |
| Dielectric Constant | 3.6 @ 1GHz 3.5 @ 10GHz 3.6 @ 19.8GHz | 3.7 @ 1GHz 3.5 @ 10GHz 3.6 @ 19.8GHz |
| Dissipation Factor | 0.013 @ 1GHz 0.012 @ 10 GHz 0.012 @ 19.8GHz | 0.013 @ 1GHz 0.012 @ 10 GHz 0.012 @ 19.8GHz |
| Peel Strength – Vertical direction, 50 mm/min | 5 N/cm minimum | >5 N/cm minimum |
| Halogen Level | 247 ppm | 582 ppm |
| Outgassing by ASTM E 595 (TML <1.0% and CVCM <0.1%) | TML = 0.27% Pass CVCM = 0.01% Pass | TML = 0.56% Pass CVCM = 0.01% Pass WVR = 0.47% Pass |
| UL Name: | THP-100DX | THP-100HTG |

Positioning of THP-100DX series



-  Plug Material
-  Dielectric Material
-  Core Material

* Core board Property : Quoted from Catalog
CTE < Tg : Z direction

* Plug Material: X-Y direction TMA

* Cu CTE : X-Y direction TMA
Copper foil → GTS-MP-35um (Furukawa Circuit Foil)
Electro Plating → ATOTECH ~30um

Warranty Period for THP-100DX1 VF & THP-100DX1 VF(HV): 12 Months from Production Date if Stored at or below -10°C (14°F).

Warranty Period for THP-100DX1 (HTG): 12 Months from Production Date if Stored at or below 5°C (41°F).

Taiyo America, Inc. (TAIYO) warrants its products to be free from defects in materials and workmanship for the specified warranty period (**THP-100DX1 Warranty period is 12 Months**) provided the customer has, at all times, stored the THP-100DX1 VF and THP-100DX1 VF (HV) versions at a temperature of 14°F (-10°C) or less, and the THP-100DX1 HTG version at 41°F (5°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.