

THERMO COOL

**YOUR THERMAL
MANAGEMENT SOLUTION**

THERMO COOL 10.2W

- Single-Component
- Screen Print or Via Fill Application
- Thermally Cured
- Thermal Conductivity > 10W/mK
- Low outgassing
- Halogen free
- Silicone free
- Epoxy based
- High Tg (169°C)
- Very low CTE
 - $\alpha 1$ – 14 ppm
 - $\alpha 2$ – 45 ppm



PROCESSING PARAMETERS FOR THERMO COOL 10.2W

Thermo Cool 10.2W has a gray matte finish. It is a single-component, thermally cured product. It has been designed as a thermal conductive / heat dissipating product. **Thermo Cool 10.2W** has multiple applications for the PCB manufacturing process. It can be applied via screen printing as a thermal conductive adhesive/underfill for packaging. It can also be screen printed as a Thermal Interface Material (TIM) for LED applications and lastly it can be used for via fill applications to improve thermal management. 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

Thermo Cool 10.2W is supplied in cartridges or larger 1 kg containers.

Thermo Cool 10.2W needs to be stored frozen at or below 14°F (-10°C) to maintain a 1-year shelf life.

Other storage guidelines are listed below:

Storage Temperature	Maximum Storage
	Thermo Cool 10.2W
Freezer: 14°F (-10°C)	365 days
Refrigerated: 41°F (5°C)	180 days
Room Temperature: 68°F (20°C)	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. For screen printing as an adhesive/underfill be sure that the coating surface is free of oils and contaminants prior to application.

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SCREEN PRINTING

For adhesive/underfill or Thermal Interface Material application.

- Screen Mesh: 74 – 110
- 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: 60 – 100 psi

VIA FILL APPLICATION

Thermo Cool 10.2W needs 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
Paste 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

OPTION 1

PRELIMINARY CURE

The preliminary cure is used to “set up” the **Thermo Cool 10.2W** 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
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PROCESSING PARAMETERS FOR THERMO COOL 10.2W

PLANARIZATION To remove the excess **Thermo Cool 10.2W** 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 **Thermo Cool 10.2W** before planarization.

FINAL CURE **Thermo Cool 10.2W** 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
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OPTION 2

FINAL CURE **Thermo Cool 10.2W** 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
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PLANARIZATION To remove the excess **Thermo Cool 10.2W** 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.

For Process Optimization please contact your local Taiyo America Representative