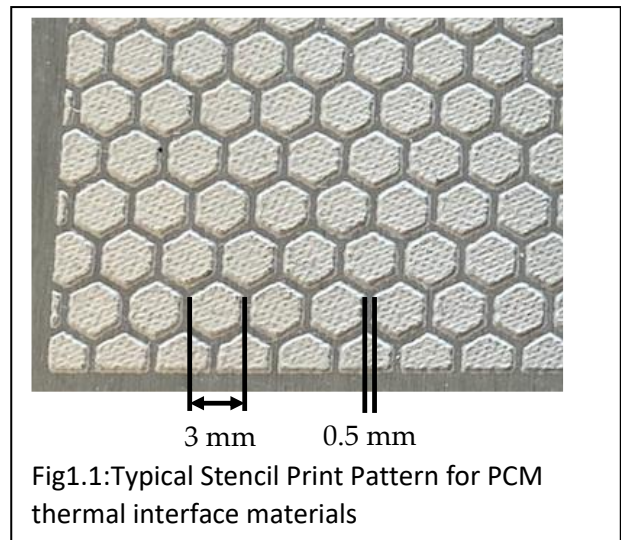

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## **Application Guide: Directions of Use for Phase Change (PCM) Thermal Interface Materials (TIM)**

### **Preparation and Printing:**

- Please read the SDS for safe handling, disposal and first aid measures before proceeding to handle this material.
- Before applying the phase change material to the desired substrate ensure that the paste is thoroughly mixed. Mix well by hand or jar rolling before application, careful to ensure that no air is introduced
  - Do not use a high-speed mixer as the heat generated from mixing may result in accelerated solvent evaporation and thus increasing the viscosity of the paste.
- For application of the paste a screen or stencil is recommended.
  - If screen printing, a screen of 80 threads per inch or fewer is recommended.
  - Ensure that the substrate is clean and dust free by the use of cleaning solvents e.g. Isopropyl alcohol or Acetone and a lint free wipe.
- A recommended print is the honeycomb pattern with dimensions of a 3 mm diameter honeycomb with a maximum 0.5 mm gap between honeycombs (see figure 1 below).
- Other patterns such as a flat continuous sheet or with varying gaps and diameters can also be printed.
- Special screen/stencil design could be employed to ensure the paste fills out any deformation/bending that occurs in the module i.e. have greater concentration of paste where less pressure/contact between module and heatsink is expected. This would be application/module design dependent.
- It is recommended that the paste thickness after drying is between 150 µm and 300 µm to ensure full contact of the PCM with the desired substrates.
- The screen or stencil employed must be thicker than the desired end application paste thickness. This is due to the paste reducing in thickness owing to paste retention to the screen and solvent loss upon paste drying. A rule of thumb is to allow for approximately 20% thickness reduction due to paste retention on the screen and a further approximately 20% thickness reduction due to solvent loss after paste drying.
- Ensure printing squeegee is fully flat. Deformation of the printing squeegee could also make the print thickness uneven.



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### **Paste Drying Protocols and Device Pressure:**


- When drying the paste, it is recommended that the surface is covered to avoid dust contamination.
- Ensure solvent drying is performed in a well-ventilated area.
- Recommended drying conditions at 100 µm thickness:
  - 10-20 minutes at 125 °C
  - 2.5 hours at 80 °C
  - 3.5 hours at 60 °C
  - Complete paste drying must be ensured before assembling the device.
- This PCM is designed for use in pressurised application with device attachment using methods such as springs. Pressures of 15 PSI and above are recommended for optimum performance.
- Ensure that any paste squeezed out during the heatsink mounting process is removed before final operation.

### **PCM Storage Guide:**

- Store pots at room temperature and ensure the pots remain tightly sealed with tape around the lid to reduce any solvent evaporation.
- To reduce the chance of the solvent separating from the paste the paste can be stored refrigerated (4-8 °C).
  - If paste is stored refrigerated ensure that the paste equilibrates to room temperature before paste application.
- The shelf life of DM-TIM-1520XS is 24 months from date of shipment when stored in the original unopened pot.
- Once pot has been opened ensure the pot is tightly resealed to avoid excess solvent evaporation.

### **PCM Rework Guide:**

- DM-TIM-1520XS can be removed from the device after use.
- To avoid damage to the device the use of a wooden or plastic spatula is recommended to help scrape away the used material.
  - A metal spatula or tool is not recommended as this is likely to scratch/damage the device.
  - A dry lint free cloth can also be used to clean the material off the device.
- Solvents such as isopropyl alcohol (IPA), acetone and isoparaffinic hydrocarbons can also be used to clean off any material from the device.

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- The device should then be clean and ready for the application of fresh material.

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All information reported in the datasheet is for experimental work undertaken in our laboratories and illustrates typical values only. Processing conditions may vary depending on customers' experience and their application requirements and manufacturing process equipment set-up.

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