



TC-330

High Temperature Resistant,
Very High Thermal Conductivity,
Alcohol Cleanable, Grease Compound

Description:

TC-330 is smooth, gray, microelectronics-grade, silicone-based, thermally conductive grease compound. It offers very high thermal conductivity, high temperature resistance, very low thermal resistance and easy dispensability. It is rated for use in applications where the continuous operating temperature is $\leq 200^{\circ}\text{C}$ and can withstand intermittent exposures up to $250\text{-}260^{\circ}\text{C}$. TC-330 has been designed for use in applications where device wattage's can exceed 100 W and where the device may later need to be easily removed from the heat sink. It can be used with a variety of emerging and standard devices including microprocessors, DSPs, graphic accelerators, etc. packaged in flip-chip, PPGA, BGA, MicroBGA and other package types. TC-330 exhibits very low bleed and has been tested extensively in demanding environments. It has shown outstanding performance in reliability testing in microprocessor and other flip-chip applications. In addition, it has a significantly lower viscosity than competitive high thermal conductivity greases and can be easily dispensed even without going to special valve technology. It has been specially formulated for use in high throughput, automated dispensing equipment without the use of needle heating.

Other typical device applications include multi-chip modules, power transistors, diodes, silicon-controlled rectifiers, mechanically attached substrates to housings, and various other mechanically attached thermal transfer applications. In these situations, a small amount of thermally conductive grease is applied to either the substrate/heat sink or the device. The thixotropic characteristics of TC-330 will usually hold the device in place until it is mechanically attached.

Thermoset TC-330 is easily removed with isopropyl alcohol or acetone. This prevents having to use a solvent that may be toxic or contain chlorinated/fluorinated compounds.

Key Features and Benefits:

- + High Thermal Conductivity – $2.9 \text{ W/m}^{\circ}\text{C}$
- + Low Thermal Resistance – $< 0.2^{\circ}\text{C in}^2/\text{W}$
($1.3^{\circ}\text{C cm}^2/\text{W}$)
- + Rated for up to 200°C Continuous Operation
- + Thin Bondlines of 1-2 mils
- + Easy to Apply by Dispensing or Printing
- + Excellent Power and Temperature Cycle Performance
- + Excellent Humidity and Aging Performance
- + Reworkable/Easy to Remove with Alcohol
- + Low Bleed
- + High Volume Resistivity

Typical Properties:

Viscosity @ 25°C (cps)	
@ 1 RPM	600,000
@ 10 RPM	165,000
ASTM D 2393	
Specific Gravity	2.92
ASTM D 1505	
Color	Gray
Shelf Life @ 5°C (months)	6
Thixotropic Index	3.6
Thermal Conductivity ($\text{W/m}^{\circ}\text{K}$) (ASTM F433)	2.90
Maximum Service Temperature ($^{\circ}\text{C}$)	200
Weight Loss	0.14 % (30 days @ 100°C) 1.0% (1 hour, 300°C)
Bleed	Nil
Dielectric Constant @ 25°C	
10 kHz:	7.62
100 kHz:	7.40
1 MHz:	7.21
ASTM D 150	
Dissipation Factor @ 25°C	
10 kHz:	0.0257
100 kHz:	0.0189
1 MHz:	0.0215
ASTM D 150	

Reliability Test Results:

Passed

Power Cycle:	5000 cycles from 25 to 100°C
Temperature Cycle:	100 cycles from -55 to $+150^{\circ}\text{C}$
Humidity Testing:	500 hours of $85^{\circ}\text{C}/85\%$ RH exposure
High Temperature Aging:	500 hours of 135°C exposure

Shelf Life and Storage:

TC-330 has a shelf life of six months at 5°C . TC-330 should be stored at 5°C to retain optimal properties.

Clean-Up:

It is recommended that customers use disposable containers and utensils whenever possible to simplify clean-up. However, when disposable materials are impractical, TC-330 can be removed by cleaning equipment with a solvent such as isopropyl alcohol. Observe appropriate precautions when using flammable solvents. Solvent-cleaned utensils should be thoroughly dried before reuse. Any remaining solvent can contaminate TC-330 during the next application or use.

Handling Precautions:

The labels on containers of Thermoset materials contain current information on the hazards associated with each particular product. Most resins and hardeners are skin and eye irritants, and some may actually be corrosive to the skin and eyes. Other problems, such as skin sensitization or serious health hazards may exist. Further information on each product is contained in the Material Safety Data Sheet, which will be sent upon request.

Shipping and Unpacking Procedure:

This material is packed and shipped in Johnny Blue Ice at approximately 5°C to protect it from thermal excursions during shipment. The substantially engineered system of an insulated container and packing material is designed to protect the material for up to 6 days in transit (international) and up to 48 hours in transit (domestic). It is critical that the shipping container is not opened in transit and that the shipment be expedited during transit to its final destination. **DO NOT ALLOW THE SHIPMENT TO BE LEFT ON LOADING DOCKS, IN CUSTOMS WAREHOUSES, OR ON FREIGHT TRUCKS FOR LONG TIME PERIODS.**

Maintaining temperature at or below 5°C, but not less than 0°C, upon receipt is critical to maintain the functionality and performance of the material. Failure to maintain temperature at 0°C to 5°C, unless otherwise stated on the technical data sheet, will void any warranties and may adversely affect performance.

Upon receipt, the syringes must be transferred from the shipping container to a suitable storage environment.

NOTE: Please refer to the technical data sheet for alternative storage condition recommendations.

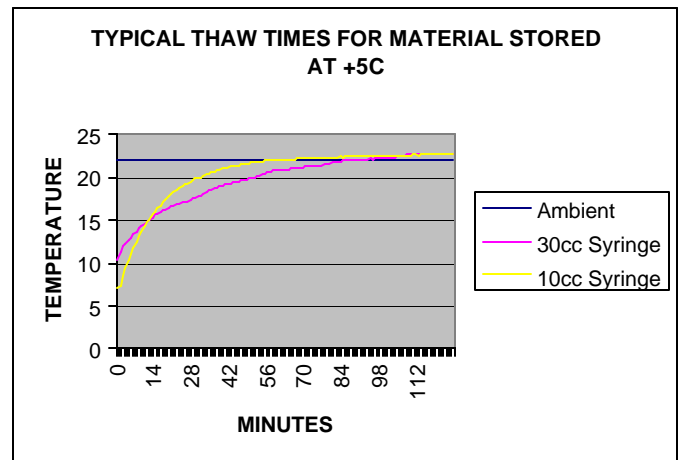
Storage and Thaw Procedure:

ALL SYRINGES MUST BE STORED AS RECOMMENDED (TYPICALLY 0°C TO 5°C) IN AN UPRIGHT (VERTICAL)

POSITION WITH THE SYRINGE TIP FACING DOWN. DO NOT LAY SYRINGES ON THEIR SIDES (HORIZONTALLY) UNDER ANY CIRCUMSTANCES.

Prior to application, the material must be allowed to thaw naturally to room temperature (ideally 20-25°C) by placing the syringes in a vertical position with dispense tip facing downward in an ambient environment. This is a critical step for obtaining optimum dispensing performance.

Under no circumstance should artificial heat sources be used to increase thaw speed. Do not place the syringes in warm water or near any heat source including ovens, hot plates, hot air guns, etc. Thaw time varies by package style and size and is typically 45 to 75 minutes based on ambient temperature. Please refer to the chart below.



Do not use the syringes before contents reach ambient temperature. Wipe all excess moisture from the syringes prior to use. A small amount of air in the tip-cap area is normal. Carefully remove the tip cover and manually extrude a small amount of material displacing any air that may be in the tip – cap interface. Mount the syringe onto the dispense equipment that has been thoroughly cleaned and purge material through the system until an unbroken flow of material is extruded. The system is now ready to begin dispensing.

Once thawed to room temperature, the syringes must be consumed within the allotted working life specified then discarded. Under no circumstances should the material be refrozen for reuse or consumed after the working life has expired.

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IMPORTANT NOTICE TO PURCHASERS: Only those properties identified as "specifications" on Thermoset technical bulletins are tested by Thermoset's Quality Control Department prior to shipment. The results of these tests must conform to those "specifications". Other properties are "typical". Tests are not run on the "typical properties" of every batch produced. "Typical property" data is not intended for specification purposes and Thermoset assumes no responsibility and makes no warranty with respect to it. If any property, other than those designated as Thermoset "specifications", is important to the purchaser, information as to such property will be supplied only upon the basis of test procedures agreed upon between Thermoset and the purchaser prior to the acceptance of the purchaser order.

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