

# CoolTherm™ ME-531 Underfill Encapsulant

## Description

LORD CoolTherm™ ME-531 encapsulant is a high purity, semiconductor grade epoxy underfill product developed for the encapsulation of flip chip devices. It is formulated to reduce warpage and with the necessary structural strength to handle over-molding processes.

CoolTherm ME-531 encapsulant is engineered to withstand 260°C peak reflow temperatures of lead-free solders.

## Features and Benefits

**Self-Filleting** – provides surface tension and viscosity flow properties to achieve full coverage without producing bulky fillet on top of device.

**Jettable** – provides low viscosity for high speed jetting dispense.

**Rapid Flow** – formulated to flow consistently without voids while maintaining a fast flow rate; can be used under small dies and under devices with stand-off heights above 25 micron.

**Low Coefficient of Thermal Expansion** – minimizes the possibility of cracking during temperature cycling (-40°C to +125°C); provides excellent thermal shock performance.

**Good Adhesion** – provides good adhesion to laminate, ceramic, solder mask and metal surfaces.

**Device Reliability** – provides high Tg and high fracture toughness, reducing the amount of thermally induced stress placed on the solder interconnects.

## Typical Properties\*

### Uncured

Appearance	Black, Low-viscosity Liquid
Viscosity, cps @ 25°C CP40, 5 rpm	4000
Specific Gravity	1.71
Gel Time, min @ 150°C	6
Working Life, hr @ 25°C	16

### Cured

Volume Resistivity, ohm-cm @ 25°C	$1 \times 10^{15}$
Thermal Conductivity, W/mK	0.5
Coefficient of Linear Thermal Expansion, ppm/°C	
alpha 1	21
alpha 2	85
Glass Transition Temperature (Tg), °C by TMA	140
Die Shear Strength, psi	9000
Storage Modulus, MPa	6000
Moisture Absorption, %	<0.5
Extractable Ionic Contaminants, ppm	
Chloride	<10
Sodium	<5
Potassium	<1

\*Data is typical and not to be used for specification purposes.

# LORD TECHNICAL DATA

## Application

**Applying** – Before use with dispensing equipment, allow encapsulant to be warmed to room temperature (ideally 20-25°C). Thaw encapsulant by placing the syringe in a vertical (upright) position with dispense tip facing downward in an ambient environment. Consult handling instructions\*\* for specific guidelines.

To decrease underfill time, preheat substrate to 100°C prior to encapsulant application.

Mount the syringe onto the dispensing equipment that has been thoroughly cleaned and purge encapsulant through the system until an unbroken flow of encapsulant is extruded. Dispense underfill encapsulant as a corner dot extrusion.

**Curing** – Cure encapsulant for 30 minutes at 150°C, or for 15 minutes at 165°C.

**Cleanup** – Remove uncured encapsulant using common organic solvents such as acetone or isopropanol.

## Shelf Life/Storage

Shelf life is six months from date of manufacture when stored at -40°C in original, unopened container. Syringe must be maintained at -40°C in a vertical (upright) position with the dispense tip facing down. Do not store syringe on its side (horizontally).

This material is shipped and stored frozen. Consult handling instructions\*\* for thawing.

## Cautionary Information

Before using this or any LORD product, refer to the Safety Data Sheet (SDS) and label for safe use and handling instructions.

*For industrial/commercial use only.* Must be applied by trained personnel only. Not to be used in household applications. Not for consumer use.

\*\*Handling instructions are available on LORD.com.

Values stated in this technical data sheet represent typical values as not all tests are run on each lot of material produced. For formalized product specifications for specific product end uses, contact the Customer Support Center.

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