LORD
THERMOSET
Advanced Electronic Materials

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SC-320

HIGHLY THERMALLY CONDUCTIVE, ENCAPSULATING SYSTEM

Description:

Lord SC-320 is a two component silicone elastomer that provides excellent thermal conductivity, while retaining the other desirable properties associated with silicones. It is a low viscosity, easily pourable liquid that is ideally suited for electrical/electronic potting applications. It has excellent high heat performance, thermal shock resistance, and improved coefficient of expansion.

Lord SC-320 has been formulated for flame retardancy and meets UL classification 94V-0 flammability rating at 6mm as tested by Lord.

Lord SC-320 resin is pink and the hardener is white. These colors act as mix indicators. When thoroughly mixed, SC-320 is lighter pink.

Lord SC-320 is addition curing. It will not depolymerize when heated in confined spaces as do many condensation curing silicones. As with all silicones, SC-320 generates no exotherm as it cures. It also exhibits low shrinkage and stress on components as it cures.

Typical Properties:

The values listed below are averages and are not intended for specifications purposes. Contact Lord when establishing specifications. In the interest of achieving optimum properties in a minimal amount of time, the cured physical and electrical properties were developed by using a cure schedule of two hours at 100°C. The choice of cure schedule will vary with the application and users must establish their own optimum cure schedules.

Handling Properties:

Mix Ratio (resin to hardener)	
By weight	1:1
By volume	1:1
Viscosity @ 25°C STM 1	
Resin (cps)	40,000
Hardener (cps)	35,000
Mixed (cps)	35,000
Working Life, minutes @ 25°C (100 grams)	40
Typical Cure Schedule, minutes @125°C	60

Physical Properties:

Hardness (Shore A) STM 5 (ASTM D 2240)	60
Specific Gravity (STM 2)	3.1
Color	
Resin	Pink
Hardener	White
Mixed	Lighter pink
Tensile Strength (psi) ASTM D 412	300
Tensile Elongation (%) ASTM D 412	50
Water Absorption (%) ASTM D 570-81	<.1
Linear Coefficient of Thermal Expansion, ppm ASTM D 864	110
Thermal Conductivity (W/mK) Hot Disc Transient Method	3.2
Lap Shear Strength (psi) ASTM D1002	130
Silicone Extractables	meets Belcore 10.3.2 specification
Flammability Rating (as Tested by Lord) (6mm minimum thickness)	UL94V-0
Ionic Content (ppm)	
Sodium	<10
Ammonium	<10
Potassium	<10
Chloride	<10
Bromide	<10
Sulfate	<10
Temperature Rating Guide* (ºC)	200

***Temperature Rating Guide:** Is based on average design requirements and the guide is not intended as a guarantee of suitability for all applications operating at that temperature. The guide is based on the weight loss.

Electrical Properties:

Dielectric Strength (volts/mil) ASTM D 149	400
Dielectric Constant @ 25°C (1 MHz) ASTM D 150	<4.0
Dissipation Factor, (%) @ 25°C (1 MHz) ASTM D 150	<1
Volume Resistivity @ 25°C (ohm-cm) ASTM D 257	>1 x 10^{14}

In most cases, STM (Standard Test Methods) correspond with standard ASTM tests. Copies are available upon request.

Proportioning and Mixing:

In order to obtain a uniform mixture, both SC-320 resin and hardener should be thoroughly stirred prior to mixing together.

Lord SC-320 can be proportioned by weight or volume. These ratios are stoichiometrically calculated and should be closely followed. Automated meter-mix dispensing equipment may be used for high volume production. (A list of dispensing equipment manufacturers is available from Lord.)

When mixing small amounts of SC-320, it is best to use a balance and disposable containers. The containers should be large enough to hold both resin and hardener and still have ample room for mixing. After allowing for the weight of the container, the correct amount of resin is added to the container. The scale is then set for the total weight of both resin and hardener, and the hardener is added slowly until the total weight is reached.

To insure thorough mixing, periodic scraping of the sides and bottom of the container is necessary. The SC-320 should be stirred until a uniform color is observed. Even small amounts of improperly mixed material can cause soft spots or irregular curing.

Deairing and Evacuation:

Unless a closed-chamber mechanical mixer is to be used, air will be introduced into the silicone system either during mixing or when catalyzing the mixture. The electrical properties of a silicone are best when air bubbles and voids are minimized. Therefore, in extremely high voltage or other critical applications, vacuuming may be appropriate.

Should vacuuming prove to be necessary for the application, the mixed silicone should be deaired in a container large enough to allow for expansion from two to five times the original volume. A vacuum of 2 mm of Hg for two to five minutes is generally adequate for small (one quart or less) batches. Larger batches may require longer vacuuming, lower pressures (<2 mm Hg), or introduction of the silicone into the chamber in thin streams. Once the silicone has been adequately deaired, the vacuum should be slowly released.

Cure Inhibition:

As with all addition curing silicones, avoid casting Lord SC-320 against surfaces bearing amines, sulfur or tin salts. Materials such as wood or natural rubber may contain these cure inhibiting ingredients and they can leave the SC-320 soft and uncured. If in doubt, apply a test patch of catalyzed SC-320 to the surface and allow it to set for the normal cure time.

Clean-Up:

It is recommended that customers use disposable containers and utensils when working with silicones. However, when disposable materials are impractical, uncured silicone can be removed by cleaning equipment with solvent. Observe appropriate precautions when using flammable solvents. Solvent-cleaned utensils should be thoroughly dried before reuse. Any remaining solvents can contaminate the next mixture.

Shelf Life and Storage:

Lord SC-320 resin and hardener have shelf lives of approximately nine months at room temperature (25°C) in closed containers. As with all highly filled, low viscosity, mineral filled systems, the high density components will stratify with time and may require re-suspension. The energy requirements necessary to insure a homogeneous material will be dependent upon age and storage conditions. Typically, the individual components can be hand-blended incorporating a figure 8 style method to achieve successful results. In the event of gross separation, mechanical agitation with a paint-shaking device (5 cycles/second, 20° rotation) is recommended for a maximum of 10 minutes. Excessive agitation or the use of electrically driven impellers may result in increased viscosity due to air entrainment.

Special Precautions:

Lord SC-320 evolves minute quantities of hydrogen gas. Do not repackage or store in unvented containers. Adequately ventilate the work area to prevent the accumulation of gas.

Handling Precautions:

The labels on containers of Lord materials contain current information on the hazards associated with each particular product. Most silicone compounds may be irritating to the eyes and some may be mild skin irritants. Further information on each product is contained in the Material Safety Data Sheet which will be sent upon request.

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