

# LOCTITE ECCOBOND FP4322

July 2018

## PRODUCT DESCRIPTION

LOCTITE ECCOBOND FP4322 provides the following product characteristics:

|                    |                            |
|--------------------|----------------------------|
| <b>Technology</b>  | Epoxy                      |
| <b>Appearance</b>  | Black                      |
| <b>Cure</b>        | Heat cure                  |
| <b>Application</b> | Semiconductor, Encapsulant |

LOCTITE ECCOBOND FP4322 is a high purity liquid epoxy encapsulant designed for semiconductor encapsulation. It is a high flow material which requires a cavity of flow control barrier to prevent excessive flow.

LOCTITE ECCOBOND FP4322 is suitable for encapsulating bare chips mounted to plastic substrates as well as potting of small hybrid circuit modules. Spot encapsulation of bare chips on ceramic substrates is not suggested in most cases.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

|                                                   |        |
|---------------------------------------------------|--------|
| Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP):   |        |
| Spindle 7, speed 2 rpm                            | 92,500 |
| Spindle 7, speed 20 rpm                           | 52,500 |
| Specific Gravity @ 25 °C                          | 1.69   |
| Filler Content, %                                 | 65     |
| Pot Life @ 25 °C (time to double viscosity), days | 1      |
| Shelf Life, days:                                 |        |
| @ 25°C                                            | 2      |
| @ -40°C                                           | 120    |
| Flash Point - See SDS                             |        |

## TYPICAL CURING PERFORMANCE

### Gel Time

|                            |    |
|----------------------------|----|
| Gel Time @ 121 °C, minutes | 11 |
|----------------------------|----|

### Recommended Cure Schedule

- 2 to 3 hours @ 170°C or
- 3 to 6 hours @ 150°C

### Alternate Cure Schedule

- 1 hour @ 125°C plus 4 hours @ 150°C

The recommended alternate cure schedule is designed for packages which are effected by high levels of stress.

A two-step cure will minimize stress and warpage on large substrates. Curing below 140°C is not recommended. User should gel devices immediately after dispensing to prevent moisture degradation of ultimate cure properties. Use suggested cure schedules as general guidelines; other cure schedules may yield satisfactory results.

The above cure profiles are guideline recommendations. Cure conditions (time and temperature) may vary based on customers' experience and their application requirements, as well as customer curing equipment, oven loading and actual oven temperatures.

## TYPICAL PROPERTIES OF CURED MATERIAL

### Physical Properties :

|                                                  |                     |
|--------------------------------------------------|---------------------|
| Hardness, Shore D                                | 97                  |
| Glass Transition Temperature (Tg), °C            | 160                 |
| Coefficient of Thermal Expansion, in/in/°C:      |                     |
| @ 40 to 120°C                                    | 30×10 <sup>-6</sup> |
| Density, gm/cc                                   | 1.7                 |
| Linear Shrinkage, %                              | 0.43                |
| Extractable Ionic Content, ppm:                  |                     |
| Chloride (Cl-)                                   | 25                  |
| Potassium (K+)                                   | 25                  |
| Sodium (Na+)                                     | 25                  |
| Moisture Absorption, 9 hour immersion @ 100°C, % | 0.25                |

### Electrical Properties:

|                                                  |                      |
|--------------------------------------------------|----------------------|
| Volume Resistivity, ohms-cm                      | 6.2×10 <sup>14</sup> |
| Surface Resistivity, ohms                        | 1.6×10 <sup>14</sup> |
| Dielectric Constant / Dissipation Factor @ 25°C: |                      |
| @ 1 KHz                                          | 3.18/0.005           |
| @ 10 KHz                                         | 3.15/0.006           |
| @ 100 KHz                                        | 3.04/0.11            |

## GENERAL INFORMATION

For safe handling information on this product, consult the Safety Data Sheet, (SDS).

### Not for product specifications

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

## DIRECTIONS FOR USE

1. Warm at room temperature until no longer cool to the touch (normally 20-60 minutes).
2. Do not thaw in an oven or water bath.
3. For best results LOCTITE ECCOBOND FP4322 should be dispensed onto a substrate warmed to approximately 90°C. This will help minimize air entrapment under bonding wire.

**STORAGE**

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

**Optimal Storage : -40 °C .**

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

**Conversions**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{psi} \times 145 = \text{N/mm}^2$   
 $\text{MPa} = \text{N/mm}^2$   
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$   
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$   
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$   
 $\text{mPa}\cdot\text{s} = \text{cP}$

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