

PRODUCT DESCRIPTION

Hysol® FP4548FC is a high purity, liquid epoxy encapsulant designed as an underfill for flip chip devices. FP4548FC features low coefficient of thermal expansion properties and improved toughness. When fully cured, FP4548FC forms a rigid, low stress seal that dissipates stress on solder joints and extends thermal cycling performance. This material is specially suited for flip-chip devices requiring improved crack/fracture resistance and no-clean flux compatibility.

TYPICAL APPLICATIONS

Encapsulant for flip chip devices

PROPERTIES OF UNCURED MATERIAL

Color	Gray
Filler content, (% ignition), (ITM3A)	65
Flow rate (500 mil flow 2 mil gap, 100°C)	30 seconds
Shelf Life @-40°C, (-40°F), months	9

Typical Value

Viscosity (ASTM D2393)	
Brookfield Cone & Plate	
@ 25°C (77°F)	
CP52, Speed 20, Cp	20,000

PHYSICAL PROPERTIES, CURED MATERIAL

Color	Black
Glass Transition (Tg), °C, (ITM65B)	120
Coefficient of Linear Thermal Expansion, (ITM65B), (Cured 120 minutes @ 165°C)	
α ₁ , ppm/°C	22
α ₂ , ppm/°C	85
Flexural Modulus, GPa (ASTM D790))	9.5
Extractable Ionic Content, (ITM107B)	
Chloride (Cl-), ppm	50
Sodium (Na+), ppm	5

Handling

Gel Time @ 121°C, (250°F), minutes, (ITM10N)	20
Pot Life @ 25°C, (77°F), hours (ITM10T), (time required to double viscosity)	24

Frozen storage at approximately -40°C, or lower is required for maximum shelf life. Frozen packages must be completely thawed before use. Warm at room temperature until no longer cool to the touch (normally 60-90 minutes). Do not thaw in an oven. To encapsulate flip chips by capillary action, the chip and substrate must be thoroughly cleaned. A bead of Hysol® FP4548FC is then applied to one or two sides (L-shape) of the chip perimeter. For best results, the material should be dispensed onto a substrate that has been preheated to approximately 100-120°C and held at that temperature until flow stops.

After the material has completely flowed under the chip, the device must be promptly cured according to suggested cure to achieve full properties. Devices with wet encapsulant should not be exposed to humidity in the air. If material cannot be initially gelled to hard finish within one hour after dispensing, storage in a desiccator cabinet is suggested until full curing is possible.

GENERAL INFORMATION

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

CURE SCHEDULE

Recommended Cure	30minutes @ 165°C
Alternate Cure	90minutes @ 150°C
(Enhanced Performance)	

Use suggested cure conditions as general guidelines. Other cure conditions may yield satisfactory results. With all fast cure systems, the minimum required time for cure depends on the rate of heating. Conditions where a hot plate or heat sink is used are optimum for fastest cure. Cure rates on the mass of material to be heated and intimate contact with the heat source.

Note

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