Hysol®

FP4450HA

March 2010

PRODUCT DESCRIPTION

FP4450HA provides the following product characteristics:

Technology	Epoxy
Appearance	Black
Product Benefits	• High purity • Low ionic impurities • Improved wet adhesion • Excellent moisture resistance • Good thermal stability • High flow properties • Forms a rigid, low stress seal
Cure	Heat cure
Application	Encapsulant
Operating Temperature	-65 to 150 °C

FP4450HA high performance liquid epoxy encapsulant is designed to dissipate stress and extend thermal cycling performance. Autoclave performance on live devices is greater than 1,000 hours with no failure, depending upon device and package type. FP4450HA features filler with 25micron maximum particle size, giving it improved handling properties for fine wire pitch applications.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Viscosity, Brookfield - RVF, 25 °C, mPa·s (cP):	
Spindle 6, speed 20 rpm	20,000
Filler Content, % Ignition	73
Pot Life @ 25 °C(time to double viscosity), days	4
Gel Time @ 121ºC, minutes	11
Shelf Life @ -40°C, months	9
Flash Point - See MSDS	

TYPICAL CURING PERFORMANCE

Recommended Cure Schedule

30 minutes @ 125°C plus
90 minutes @ 165°C

Designed to be used with packages which are affected by higher levels of stress. This cure will give optimum properties.

Alternative Cure Schedule

1 hour @ 110°C plus
3 hours @ 165°C

Designed for robust packages which are not sensitive to stress.

Substrate Temperature

Temperature, °C	90

The above cure profile is a guideline recommendation. 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:

Coefficient of Thermal Expansion , ppm/°C:		
Below Tg (40 to 120°C)		21
Above Tg (190 to 220°C)		72
Glass Transition Temperature (Tg), °C		149
Extractable Ionic Content, ppm:		
Chloride (Cl-)		<2
Sodium (Na+)		<1
Flexural strength	N/mm² (psi)	113 (16,385)
Flexural Modulus	N/mm² (psi)	11,500 (1,667,500)
Alpha Particle Emissions, cts/cm² /hr		0.001

GENERAL INFORMATION

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

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.

THAWING:

1. Frozen packages must be completely thawed before use.
2. Warm at room temperature until no longer cool to the touch (normally 60 to 90 minutes).
3. DO NOT thaw in an oven.

DIRECTIONS FOR USE

1. A positive displacement pump is recommended for reproducible shot sizes.
2. An 18 to 20gauge tapered tip needle should be used for easy dispensing.
3. For best results, the material should be dispensed onto a substrate that has been preheated to approximately 90°C and held at that temperature until flow stops.
4. Moisture curing begins immediately after product is exposed to the atmosphere. Parts should be assembled within a few minutes after the product is applied.
5. The cured properties of moisture contaminated material will be poorer than those described.
6. **NOTE:** Elevated temperatures reduce working life.

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. Storage below minus (-)40 °C or greater than minus (-)40 °C can adversely affect product properties.
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
(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm^2 x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

Note
The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

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