Plasma Ruggedized Solutions
Global Provider of Custom Ruggedized Engineering Solutions across Industry

TECHNICAL DATA SHEET (DRAFT COPY)
KRYPTOS

11/29/2011

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DESCRIPTION:

KRYPTOS is a filled, RoHS compliant, medium viscosity, self extinguishing flame retardant, thermally conductive epoxy casting resin system. As tested by an independent party, it passed the criteria for a vertical burn rating of 94V-0 at 6mm thickness. This system was designed to meet the physical security requirements of FIPS 140-2 for an encapsulating material.

It provides very good resistance to water, salt spray, inorganic acids and bases and most organic solvents. It cures at room temperature to a tough, semi-rigid polymer, It exhibits good wetting and adhesion to most surfaces and is free flowing to penetrate voids and provide good air release. KRYPTOS contains flame retardant package and thermally conductive fillers which can separate over time, although it has good resistance to hard settling. It will generally reach a state of "cure-to-handle" at room temperature within 8 to 12 hours depending upon mass and ambient temperature. Full cure is usually achieved within 24 to 48 hours. Cure time can be accelerated by the application of heat after product has gelled. Times and temperatures from 2 hours at 60°C to 30 minutes at 100°C are typical for most castings (less than 100 grams).

TYPICAL PROPERTIES:

All properties given are at 25°C unless otherwise noted.

UNCURED PROPERTIES:		
Specific Gravity	Part A	2.16
	Part B	0.97
	Mixed	1.97
Viscosity, cP (mixed)		6,000 to 7,000
Color (standard mixed color)		Black
Shelf Life (from date of shipment in original sealed containers)		12 Months

PHYSICAL PROPERTIES:	
Hardness, Shore D (ASTM D2240-05)	88-92
Service Temperature, °C	
Continuous	-40 to 155**
Intermittent	-65 to 200**

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PHYSICAL PROPERTIES (continued):

Tensile Strength, psi @ 25°C (ASTM D 638-10)		
Ambient cure, 7 days @ 20°C		6000*(nominal)
Heat cure, 2 hours @ 60°C		6750*(nominal)
Tensile Elongation, % @ break (ASTM D 638-10)		
Ambient cure, 7 days @ 20°C		0.65 to 0.80*
Heat cure, 2 hours @ 60°C		0.65 to 0.80*
Tensile Modulus, psi @ 25°C (ASTM D 638-10)		
Ambient cure, 7 days @ 20°C		1098000*(nominal)
Heat cure, 2 hours @ 60°C		1167000*(nominal)
Compressive Strength, psi @ 25°C		
Ambient cure, 7 days @ 20°C		23,500*
Heat cure, 2 hours @ 60°C		24,000*
Shear Strength, psi @ 25°C (ASTM D 732-10)		
Ambient cure, 7 days @ 20°C		4500*(nominal)
Heat cure, 2 hours @ 60°C		5160*(nominal)
Izod Impact, ft lbs/in of notch		0.4*
Heat Distortion, °C		160 to 170*
Water Absorption, % (ASTM D 570-98)		0.3
Linear Shrinkage, in/in		0.002*

THERMAL PROPERTIES:

Thermal Conductivity, W/m·K (ASTM E 1530-11)		0.70
Coefficient of Thermal Expansion, in/in/°C $x10^{-6}$		40*

ELECTRICAL PROPERTIES:

Volume Resistivity, ohm·cm (ASTM D 257-07)		$3.95 x10^{15}$*
Dielectric Constant	@ 100 kHz	4.69*
	@ 1 MHz	4.80*
Dissipation Factor	@ 100 kHz	0.017*
	@ 1 MHz	0.018*
Dielecric Strength, V/mil		410-440*
0.003" thickness, V/mil		1,000-1,500*
0.125" thickness, V/mil		430-455*

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MIX RATIO: (Part A to B)

by weight	11.34 to 1
by volume	5.09 to 1

INSTRUCTIONS:

1) Bring both components to room temperature (25°C +/- 3°C) stirring Part A in its shipping container to assure a homogenous consistency, and proper dispersion of the fill before use. Power mixing equipment is recommended with a suggested operating speed of between 500rpm to1000rpm with a mixing paddle (metal or plastic) sufficient to turn material and disperse any filler. Product should be stored at a cool temperature (5°C +/- 3°C) for maximum shelf life. Bulk containers should be inverted every two to three weeks to reduce the accumulation of the flame retardant fillers on the bottom of the containers. Inventory should be rotated on a FIFO (first in, first out) basis. Part B should be stored at 25°C +/- 3°C.

2) If used in bulk, weigh desired amount of compound in a clean container, mixing parts A and B accurately and thoroughly in the proportion specified. During mixing scrape the sides of container often in an effort to prevent unmixed material. Do not pour from mixing container, transfer to a new container as residual unmixed material may cause a tacky spot or cosmetic blemish on surface of casting. If product is used in a side-by-side cartridge, attach a new static mixer with each cartridge, pre-bleed the first 3 inches of dispensed material or until a uniform color is obtained. Maintain adequate velocity during dispensing to ensure complete mixing.

3) When it is necessary to remove entrapped air, evacuate prior to pouring. A vacuum of 2 Torr or less is typically recommended to ensure air removal.

4) Allow to cure undisturbed. In order to accelerate full cure, heat may be applied after the product has gelled. See Cure Schedule for detailed information on temperatures and times.

USE IN A WELL VENTILLATED AREA WITH APPROPRIATE PPE, AND AVOID CONTACT WITH EYES AND SKIN.

CURE SCHEULE:

Pot Life, 200 grams @ 25°C (77°F)	1 to 2 hours
Gel Time @ 25°C (77°F)	6 to 8 hours
Handle Time @ 25°C (77°F)	12 hours
Cure Time @ 25°C (77°F)	24 to 48 hours
Heat Cure Time @ 60°C (140°F)	2 to 4 hours (after Gel Time)
Heat Cure Time @ 100°C (212°F)	30 minutes (after Gel Time)

* Asterisk denotes values considered typical to associated resin systems or extrapolated from other test results.
** General use guideline, based on weight loss at elevated temperature.
Notes:
Values presented above are considered to be typical properties, not to be used for specification purposes. Pleas contact our Technical Department for further information.

SHELF LIFE: 12 Months from date of shipment – Bulk Packaging

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