PSPA

POLYSEBACIC POLYANHYDRIDE

Description

PSPA is a polymeric anhydride epoxy curing agent which can cure epoxy resins without the use of tertiary amines or other accelerators. In addition to long pot life at elevated temperatures, and low vapor pressure, PSPA approaches the ideal of a one component epoxy system.

The unique combination of toughness and thermal resistance allows PSPA cured epoxy systems to pass thermal cycling of 170˚C to -40˚C in the Navy hex-bar test. Even after thermal aging for 10,000 hrs. @ 150˚C, over 95% of the electrical properties are maintained.

PSPA can be ground and dispersed in epoxy resin to yield a one component, stable, liquid paste. PSPA also provides the highest degree of thermal stability for toughened epoxies. NASA selected it for use in the Apollo Heat Shields and for the Orion Heat Shield.

Chemical Name: Polysebacic Polyanhydride
Molecular Weight: 1600-1700 CAS Number: 26776-29-4

Typical Applications for PSPA Cured Epoxy Resins

- Flexible Potting
- Electrical Encapsulation
- High heat resistant ablative baked coatings
- Epoxy transfer molding compounds
- Electrostatic spray coatings

Specifications

Appearance	Tan, Fused, Waxy Solid
Melting Point	72 – 82 ˚C
Boiling Point, 760 mm Hg	>250 °C
% Anhydride	34.0 Min.
% Free Acid	5.0 Max.
Specific Gravity (80˚– 85˚C)	1.0 – 1.1

Typical Formulation

The mix ratio is not critical. Varying the mix ratio provides varying degrees of flexibility. Full cure is maintained by PSPA also facilitating epoxy:epoxy reactions. The cured product is a flexible solid which will pass Class H requirements. Conventional fillers may be incorporated to increase hardness and HDT, and to improve electrical properties. Some variables for transfer molding compounds are outlined as Formulation Guides.

	Transfer Molding	Potting/Encapsulation
Epoxy Resin (EEW= 875-1025)	100	(EEW=190) 100
PSPA	25	75
Gel Time at 14O˚C, minutes	60-90	60-90
Full Cure at 150°C, hours	6-8	4-8

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Transfer molding compositions may be ground separately and dry blended, or B-staged and ground. In either case, the addition of accelerator to the ground powder will appreciably decrease gel time. High heat resistant ablative coatings can also be prepared based upon the above formulation guides. Fluidized bed and electrostatic spray coatings are possible by use of the ground powder.

Properties

Modulus of Elasticity	0.42×10^5
Hardness, Shore D	73
Tensile Strength, psi	4735
Elongation %	116.6
Heat Deflection, 10 mil	34°C
Breakdown Voltage, Volts/Mil	298

Cure Schedule: 1 Hr. @ 14O˚C + 8 Hrs. @ 150˚C

ELECTRICAL PROPERTIES

Temperature ˚C	Applied Voltage, AC	Volts per Mil Applied	% Power Factor
25	**1800**	**15**	**1.2**
25	**7400**	**60**	**8.9**
171	**1800**	**15**	**16.8**
171	**7400**	**60**	**26.8**
Breakdown Voltage, Volts/Mil			**298**

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