ELANTAS
Electrical Insulation

Product Information

Electronic Protection System

Thick Film Coating, thermal cure

Bectron® PK 4351

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Product description

Bectron® PK 4351 is a one-component resin system which cures to form a fairly soft polyurethane duroplastic. It comprises a liquid polyol system with a dispersed solid encapsulated polyisocyanate and a pigment combination selected to provide controlled rheology including excellent thixotropic properties.

Heating the resin releases the encapsulated polyisocyanate resulting in a polyaddition reaction to give a resistant duroplastic cured material.

In contrast to the usual 2 component resin systems Bectron® PK 4351 is ready to use and distinguished by excellent properties and especially good environmental compatibility.

Areas of application

The cured Bectron® PK 4351 is a semi-flexible duroplastic suitable for chemical and shock protection of components.

It is therefore most suited for the partial or selective coating of SMD and other components groups on printed circuit boards and ceramic substrates. It is also used as a casting/potting resin for electronic components and sensors, automotive electronics, plugs such as

- hybrid coating
- glass diode coating
- partial coating of circuit board components
- ceramic substrate

Properties of the cured material

The cured material displays elasticity and strength resulting in very good temperature cycling behaviour within the range of -60°C to +125°C as well as resistance to moisture.

Bectron® PK 4351 also displays very good adhesion to most materials used in the electronic field.
Even after several temperature cycles there is no loss of adhesion, and mechanical and electrical properties are maintained.

Satisfies ROHS Directive

Storage

Containers filled with Bectron® PK 4351 should be stored at a temperature ≤ 25°C and kept closed to protect the resin against humidity.

During longer storage periods of the containers, some settling of the pigments can occur and it is advisable to homogenise the resin by rotation of the containers prior to filling storage or service tanks.

Processing suggestions

Prior to processing the resin compound in a storage tank should again be stirred well, e.g. 10 minutes at 20 rpm. Vacuum is not needed, but a nitrogen atmosphere is advisable to protect from humidity.

Application can be by dipping or via suitable dispensing equipment.

Hybrid coating is preferably done by dipping. A uniform, even, coating of pins with no dripping or edges can be achieved with only one application. The cycle times for immersing, and retraction depend on the object to be processed.

For partial coating the use of dispensing equipment is recommended. During dispensing, the shear applied to the resin, governed by the diameter, length and applied pressure on the dispensing needle, reduces the viscosity allowing fast processing and blister-free casting. On contact with the object the viscosity increases rapidly and enables precise coating of the designated areas. The resulting coating maintains its form and size even during subsequent curing.

The following curing conditions are recommended:

- 60 minutes at 80°C or
- 30 minutes at 90°C

For volume production the application of infrared (IR) radiation leads to a considerable reduction of curing times, e.g. values of <10 minutes are attainable.

To ensure satisfactory adhesion on the PCB surface the following should be checked:

- Use of residue-free flux
- ensure dry surfaces
- Check compatibility of the coating resin with the solder resist and solder paste.

Table 1 - Properties of component as supplied

Property	Condition	Value	Unit
Viscosity, DIN 53019	D=15 s^{-1}, 23°C	6.250 ± 1.250	mPas
Density, DIN 51757	23°C	1,38 ± 0,01	g/cm³
Shelf life	23°C	7	months

Table 2 - Gel-time, curing conditions

Property	Value	Value	Unit
Temperature	80	90	°C
Gel-time	5 ± 2		min
Curing	65 ± 5	30 ± 5	min

Table 3 - Thermal properties of cured compound

Property	Condition	Value	Unit
Coefficient of thermal expansion, Beck Test M 56	-20°C to + 90°C	180 x10^{-6}	K^{-1}
Thermal conductivity, DIN 52616	23°C	0,18 ± 0,02	W/mK

Table 4 - Mechanical properties of cured compound

Property	Condition	Value	Unit
Glass transition temperature, IEC 61006	-	-50	°C
Shore hardness, ISO 868	23°C	30 ± 10	Shore D
Compressive strength, ISO 604, DIN 57291	30%, 23°C	19	N/mm²
Residual deformation	23°C	1.9	%

Table 5 - Dielectric properties of cured compound

Property	Condition	Value	Unit
Volume resistivity, IEC 60455 Part 2 After water immersion	Initial value 7d	10^{13} 10^{11}	Ω • cm Ω • cm
Dielectric strength, IEC 60455 Part 2	23°C 80°C	17 20	kV/mm kV/mm
Tracking, IEC 60112	Solution B	CTI>600 M	
Dielectric dissipation tanδ, IEC 60250	10 kHz, 1V 23°C	0.036	-
Relative permittivity tanδ, IEC 60250	10 kHz, 1V 23°C	5.3	-

Table 6 - Chemical properties of cured compound

Property	Condition	Value	Unit
Water absorption, ISO 62, Method 1	24h / 23°C	116	mg