

Product Information

Electronic Protection System

Thick Film Coating, thermal cure

Bectron[®] PK 4340

ELANTAS Beck GmbH
Grossmannstr. 105
20539 Hamburg
Germany
Tel +49 40 78946 0
Fax +49 40 78946 276
bectron.elantas.beck@altana.com
www.elantas.com

Product description

Bectron® PK 4340 is a one-component resin system which cures to form a 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 4340 is ready to use and distinguished by excellent properties and especially good environmental compatibility.

Areas of application

The cured Bectron® PK 4340 is a soft duroplastic suitable for vibration protection of delicate components.

Bectron® PK 4340 is therefore well suited for the partial or selective coating of SMD and other components groups on printed circuit boards and ceramic substrates. The rapid increase of viscosity at low shear allows small areas of components to be protected individually.

Bectron® PK 4340 can be applied as a dam around an area requiring thicker coating to be filled by a lower viscosity grade such as PK 4342.

Properties of the cured material

The cured material displays high elasticity and strength producing excellent temperature cycling behaviour within the range of -60°C to +125°C as well as resistance to vibrations. This ensures minimal crazing even in thick layered applications.

Bectron® PK 4340 has excellent chemical resistance to a wide range of aggressive liquids common in automotive applications.

Bectron® PK 4340 has good adhesion on almost all materials used in the field of electronics. Even after several temperature cycles there is no loss of adhesion mechanical and electrical properties

Satisfies ROHS Directive

Storage

Containers filled with Bectron® PK 4340 should be stored at a temperature $\leq 25^{\circ}\text{C}$ 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 container 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.

Bectron® PK 4340 should be applied via a dispenser or similar equipment. During dispensing, the shear applied to the resin, governed by the diameter, length and applied pressure on the dispensing needle, substantially 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.

Recommended temperature for curing is:

- 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 <1 minute 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 components as supplied

Property	Condition	Value	Unit
Viscosity, DIN 53019	D=15 s ⁻¹ , 23°C	9.500 ± 1.500	mPas
Density, DIN EN ISO 2811-2	23°C	1,23 ± 0,02	g/cm ³
Shelf life	23°C	7	months

Table 2 - Pot-life, 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	200·10 ⁻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	70 ± 10	Shore A

Table 5 - Dielectric properties of cured compound

Property	Condition	Value	Unit
Volume resistivity, IEC 60455 part 2	Initial value	10 ¹³	Ω • cm
After water immersion	7days	10 ¹¹	Ω • cm
Dielectric strength, IEC 60455 part 2	23°C	22	kV/mm
Tracking, IEC 60112	Solution B	CTI 600 M	

Table 6 - Chemical properties of cured compound

Property	Condition	Value	Unit
Water absorption, ISO 62, Method 1	24h / 23°C	131	mg

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