

## **Product Information**

Electronic Protection System

**Thick Film Coating, thermal cure**

**Bectron<sup>®</sup> PK 4353**

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## Product description

Bectron<sup>®</sup> PK 4353 is a one-component resin system which cures to form a semi-flexible 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.

Bectron<sup>®</sup> PK 4353 is available in blue.

In contrast to the usual 2 component resin systems Bectron<sup>®</sup> PK 4353 is ready to use and distinguished by excellent properties and especially good environmental compatibility.

## Areas of application

The cured Bectron<sup>®</sup> PK 4353 is a semi-flexible duroplastic suitable for chemical and shock protection of components.

Bectron<sup>®</sup> PK 4353 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 etc.

## Properties of the cured material

The cured material displays high elasticity and strength resulting in very good temperature cycling behaviour within the range of -50°C to +125°C as well as good resistance to vibrations.

Bectron<sup>®</sup> PK 4353 has excellent chemical resistance to a wide range of aggressive liquids common in automotive applications.

Bectron<sup>®</sup> PK 4353 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 the level of mechanical and electrical properties is maintained.

Satisfies ROHS Directive

## Storage

Containers filled with Bectron<sup>®</sup> PK 4353 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 is likely and it is most important to homogenise the resin by rotation of the containers prior to filling storage or service tanks.

## Processing suggestions

Prior to processing the resin 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<sup>®</sup> PK 4353 is normally applied with 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, reduces the low viscosity further allowing fast processing and blister-free casting.

Recommended curing temperatures are:

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

For volume production the application of infrared (IR) radiation of a Bectron<sup>®</sup> PK 4353 layer can lead 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 solder resist and solder paste.

**Table 1 - Properties of component as supplied**

Property	Condition	Value	Unit
Viscosity, DIN 53019	D=15 s <sup>-1</sup> , 23°C	3.500 ± 500	mPa.s
Density, DIN 51757	23°C	1,33 ± 0,02	g/cm <sup>3</sup>
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 <sup>-6</sup>	K <sup>-1</sup>
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/mm <sup>2</sup>
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	10 <sup>13</sup>	Ω • cm
	7d	10 <sup>11</sup>	Ω • cm
Dielectric strength, IEC 60455 Part 2	23°C	20	kV/mm
	80°C	22	kV/mm
Tracking, IEC 60112	Solution B	CTI>600 M	
Dielectric dissipation tanδ, IEC 60250	10 kHz, 1V 23°C	0,035	-
Relative permittivity tanδ, IEC 60250	10 kHz, 1V 23°C	5,5	-

**Table 6 - Chemical properties of cured compound**

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

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