

Product Information

Electronic Protection System  
**Thick Film Coating, UV Cure**  
**Bectron<sup>®</sup> PT 4601**

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## Bectron® PT 4601

### Product description

Bectron® PT 4601 is solvent free, one-component, polyurethane based, transparent, thick film coating cured by UV irradiation and by moisture (in shadow areas). It has thixotropic properties to allow accurate application to selected areas on the PCB.

The cured product is elastic with flexibility to low temperature (-40°C) and good adhesion to most substrates. Bectron® PT 4601 and provides excellent insulation properties after several wet storage conditions.

Bectron® PT 4601 satisfies the requirements of ROHS.

### Areas of application

Bectron® PT 4601 is versatile VOC-free conformal coating with excellent electrical performance, particularly suitable for electronics such as surface mount devices and hybrids. It provides good protection against moisture, corrosion and migration as well as vibration. Bectron® PT 4601 has flow properties to allow small locations to be coated with minimum flow to other areas.

### Properties

Rapid UV curing

Moisture shadow-cure

Thermal cycling over -40°C to +120°C

Temperature resistance -40 to +120°C

Good flexibility to -40°C

Good Adhesion

Good dielectric properties

Solvent free

Thixotropic rheology

### Storage

In closed original containers storage for 6 months at 5-10°C. Storage at maximum 5°C is recommended to prevent an increase in viscosity. For longer storage Bectron® PT 4601 should be stored at -15 to-25°C. After longer storage a viscosity check is recommended. Containers should be sealed as the product is moisture sensitive

### Preparation

The components to be coated should be clean dry and free from grease and compatibility between the resin and all materials on a PCB should be checked prior to use. Residual water from washing the PCB can cause bubbles so low solids flux or alcohol based cleaning materials are recommended.

### Processing

Bectron® PT 4601 can be applied by spray, dispensing, jetting and brushing. Complete dipping or selective flooding/dipping can be used in a machine with controlled atmosphere to exclude moisture. An opened container should be used within 3 days. Thinner Bectron 300 can be used to remove liquid Bectron PT 4601 and clean the equipment.

### Curing

Curing in UV light requires 5 - 10 seconds, depending of the used type and power of the UV-lamp. A colour change from blue to green/yellow indicates the degree of UV-curing. Post-curing by moisture in shadow areas takes 2 to 3 days. Full polymerisation of the last <5 % will take place over 2 weeks achieving full properties of the material.

For a usual film thickness of  $300 \pm 50\mu\text{m}$  and  $3000 \text{ mJ/cm}^2$ , curing takes approx. 5 seconds. The conveyor speed should be 1-2.5 m/min to limit influence of heat

### Caution

The UV reactivity is high so sunlight or UV inspection lamps will start pre-curing, preventing the full development of the properties of the coating.

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

Property	Condition	Value	Unit
Colour		Blue	
Viscosity DIN 53019	D= 20s <sup>-1</sup> , 23°C	1700 ± 600	mPa.s
Density DIN EN ISO 2811-2	20°C	1.13 ± 0.05	g/cm <sup>3</sup>
Recommended Storage	5-10°C	6	Months

**Table 2 – Curing Conditions**

Property	Condition	Value	Unit
UVA	3000 ± 500mJ/cm <sup>2</sup>	5 ± 2	Sec

**Table 3 – Thermal Properties of cured compound**

Property	Condition	Value	Unit
Glass transition temperature Tg IEC 61006	penetration mode	-17	°C
Linear expansions coefficient Beck M56	above Tg	2,0 x 10 <sup>-4</sup>	°K <sup>-1</sup>
Temperature Range		-40 to +120	°C

**Table 4 - Mechanical properties of cured product**

Property	Condition	Value	Units
Specific Gravity (DIN 16945)	20°C	1.11 ± 0,05	g/cm <sup>3</sup>
Hardness (ISO 868)	23°C	65±5	Shore A

**Table 5 – Dielectric properties of cured compound**

Property	Condition	Value	Unit
Dielectric Strength IEC 60464 Part 2		20	KV/mm
Dielectric Constant IEC 60250	23°C 1KHz,	4.2	
Dielectric Dissipation, tan δ IEC 60250	23°C 1KHz,	0.07	
Volume resistivity IEC 60464 Part 2 after 7 days water storage	20°C	1 x 10 <sup>11</sup> 5 x 10 <sup>10</sup>	Ω • cm Ω • cm
Surface resistance VDE 0303 Part 3		5 x 10 <sup>11</sup>	Ω

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

Property	Condition	Value	Unit
Water absorption ISO 62 Method 1		1.52	%

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