ELANTAS
Electrical Insulation

Product Information

Electronic Protection System

Thick Film Coating, UV Cure

Bectron® PT 4601

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Bectron® PT 4601

Product description

Bectron® PT 4601 is a solvent free one-component polyurethane based transparent thick film coating cured by UV irradiation and / or by moisture. It has higher viscosity, 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 of 3 months is recommended at maximum 5°C, to prevent an increase in viscosity. For longer storage the Bectron® PT 4601 should be stored at -18°C.

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. Containers should be sealed as the product is moisture sensitive.

Processing

Bectron® PT 4601 can be applied by spray, dispensing and brushing. Complete dipping or selective flooding/dipping can be used only in a machine with controlled atmosphere to exclude moisture.

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 ± 50µm and 3000 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= $20s^{-1}$, 23°C	1700 ± 600	mPa.s
Density DIN EN ISO 2811-1	20°C	1.13 ± 0.05	g/cm^3
Shelf Life	5 °C max	3	Months

Table 2 – Curing Conditions

Property	Condition	Value	Unit
UVA	3000 ± 500mJ/cm^2	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^{-4}	$°K^{-1}$
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^3
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^{11} 5 x 10^{10}	Ω • cm Ω • cm
Surface resistance VDE 0303 Part 3		5 x 10^{11}	Ω

Table 6 - Chemical properties of cured compound

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

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