ELANTAS
Electrical Insulation

Product Information

Electronic Protection System

Urethane/Alkyd Thin Film Coating

Bectron® PL 4122-40 P

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Product

Bectron® PL 4122-40 P is part of the range of transparent coating polyurethane varnishes based on established urethane modified alkyd chemistry. It is modified to be ideal for air driven spray applications without nozzle blocking. The performance of Bectron® PL 4122-40 P meets the latest requirements of electronics, low pin corrosion and fast curing at room temperature or oven cure conditions.
Bectron® PL 4122-40 P is lead-free and has no aromatic compounds in the solvent and satisfies the requirements of the ROHS directive.

The varnish features superior performance in thermal and dielectric properties which are maintained when subjected to environmental stress.

Application

Coating of electronics:

- PCB's subject aggressive environment
  - automotive or marine navigation
  - Industrial
  - Corrosive gas

- Hybrids
- SMD devices
- discrete components
- Suitable for safety critical systems

Main Properties of Bectron PL 4122-40P

- High temperature index of 134°C
- Listed in UL 94 V0
- Superior Dielectric properties
- High volume resistivity including humid conditions
- Resists moisture, water, corrosive gas, chemicals
- Excellent adhesion to most surfaces
- All performance properties in very thin films
- ROHS Compliant
- Eminently suitable for Inspection under UV light

Resistance to Harsh Conditions

Electronic components varnished with Bectron® PL 4122-40 P provide maximum resistance against contaminants such as moisture and dust many chemicals. It can withstand corrosive gas atmosphere, weak acid fuels, oils, glycols and many other fluids used in automotive and shipping industry.

Bectron® PL 4122 40 P can survive temperature shock and temperature cycling resistance such as -40 to +130°C for several cycles

The cured coating retains good adhesion but remains flexible to withstand distortion of the PCB (Mandrel bend test)

Processing

The coating varnish Bectron® PL 4122-40 P is optimised for mass production robotic application on equipment systems where the spray is controlled by air flow or similar equipment. This coating minimizes the risk of blocking of the nozzle by slight reduction of evaporation of the solvent and reducing curing. It can also be used for dipping if the viscosity is suited to the PCB or component to be coated.
Thinner Bectron® 225 is required for dilution cleaning and for "parking cup" the nozzle.
Bectron® PL 4122-40 P is flammable and good ventilation is important in all processing areas.
In order to achieve satisfactory wetting and fault-free adhesion of the coating varnish it is important to ensure compatibility with the applied solder resist, paste and flux.

Curing

For batch Curing:
Air curing at 23°C for 16h
Accelerated curing 80°C/0,75h

Continuous Oven Curing:
Very short cure times of about 10 minutes can be achieved with the correct temperature profile in a well regulated in-line oven. Caution is needed to limit the rate of temperature increase to avoid bubbles in the coating. Guidance on curing profiles is available on request.

Re-work

If a component needs to be replaced in the in the assembled printed circuits it is possible to solder through the cured coating and the coating needs to be replaced on the new solder joint. Cleaning Agent AC 93 can be used to remove the PL 4122 up to 24 hours after curing and cleaning of equipment.

Table 1: Typical properties of coating varnish

Property	Conditions	Value	Units
Non volatile content, ISO 3251 (Solids Content) Bectron PL 4122-40 P	 1,5 g, 2 h, 130°C	 40 ± 2	 %
Viscosity - Flow Time -, DIN/EN/ISO 2431 cup Bectron PL 4122-40 P	 4 mm-Cup, 23 °C	 65 ± 5 (≈ 80)	 Seconds (mPas)
Density, DIN EN ISO 2811-2 Bectron PL 4122-40 P	 23°C	 0,89 ± 0,01	 g/cm³
Minimum shelf life	23 °C	6	months
Curing Time, (Batch oven)	23 °C, dust dry 23 °C, touch dry 23 °C, cured	0,25 1,00 16,00	h h h

Table 2 – Thermal Properties of cured coating

Property	Condition	Value	Units
Temperature Resistance, IEC 60216			°C
Flammability File-No. E 211569	Vertical	UL 94 V0	

Table 3 - Mechanical properties of cured coating

Property	Condition	Value	Units
Mandrel Bend Test, IEC 60464-2	3 mm, 0.06 mm film	>180	°
Cross Cut Test, DIN EN ISO 2409		GT 0 - 1	

Table 4 – Dielectric properties of cured coating

Property	Condition	Value	Units
Permittivity, IEC 60250	23°C 10 KHz	3.5	
Dielectric Dissipation Factor, IEC 60250	23°C 10 KHz	0.023	
Dielectric Strength, IEC 60464 part 2 - After 23 hours water immersion	23°C	112 108	KV/mm KV/mm
Volume Resistivity, IEC 60464 part 2	23°C	1×10^{15}	Ω • cm
Tracking resistance, IEC 60112		600	CTI

Table 5 – Chemical properties of cured compound

Property	Condition	Value	Units
Water absorption, ISO 62	23°, 24 hours 100°C, 0.5 hour	1.5 2.5	% %

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