ELANTAS
Electrical Insulation

Product Information

Electronic Protection System

Urethane/Alkyd Thin Film Coating

Bectron® PL 4122-R

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Product description

Bectron® PL 4122-R is a range of transparent coating polyurethane varnishes based on established urethane modified alkyd chemistry.
It provides excellent edge coverage due to thixotropic behaviour.
The performance of Bectron® PL 4122-R meets the latest requirements of electronics, low pin corrosion and fast curing at room temperature or oven cure conditions.
Bectron® PL 4122-R 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.
The coating varnish is available in the following grades:

- 2 solids/viscosity levels for each application system:

  PL 4122-41 R
  PL 4122-47 R

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- R

- 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
- Suitable for improved Inspection of coated areas with UV light
- Thixotropic behaviour of the lacquer

Resistance to Harsh Conditions

Components varnished with Bectron® PL 4122-R provide maximum protection against contaminants such as moisture and dust and many chemicals. It is resistant to corrosive gas atmosphere, weak acid fuels, oils, glycols and many other fluids used in automotive and shipping industry.

Bectron® PL 4122-R can survive temperature shock and temperature cycling resistance such as -40 to +125°C (e.g. IPC Test 2.6.7.1 Class 2) for more than 750 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-R is optimised for mass production robotic application on all major equipment systems including select coat, select spray nozzles and automated dipping systems.
It can also be used with manual and simpler applications equipment by dipping, brushing or hand-spray.
The Grade PL 4122-41 R is for general applications.
For dipping and dispensing PL 4122-47 R is usually recommended (with Thinner Bectron® 239 for dilution to the required viscosity or thickness of the lacquer).
Bectron® PL 4122-R is flammable and good ventilation is important in all processing areas.

Curing

For batch Curing:

- Air curing at 23°C for 16h
- Accelerated curing 80°C/0,5h

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 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 or Thinner Bectron 217 can be used to remove the PL 4122 up to 24 hours after curing and cleaning of equipment. Thinner Bectron 217 could be used in storage cups of automatic coating equipment to maintain excellent process ability compared with reduced evaporating rates.

Table 1: Typical properties of coating varnish

Property	Conditions	Value	Units
Non volatile content, ISO 3251 (Solids Content)	1,5 g, 2 h, 130°C		
Bectron PL 4122-41 R		41 ± 2	%
Bectron PL 4122-47 R		47 ± 2	%
Viscosity, DIN 53019			
Bectron PL 4122-41 R	23 °C; D=30s^{-1}	70 ± 20	mPas
Bectron PL 4122-47 R	23 °C; D=30s^{-1}	600 ± 150	mPas
Density, DIN/EN/ISO 2811-2			
Bectron PL 4122-41 R	23 °C	0,88 ± 0,02	g/ml
Bectron PL 4122-47 R		0,89 ± 0,02	g/ml
Shelf life	23 °C	6	months
Curing Time	23 °C, dust dry	0,25	h
	23 °C, touch dry	1,00	h
	23 °C, cured	16,00	h
	80°C (batch oven)	0.5	h

Table 2 – Thermal Properties of cured coating

Property	Condition	Value	Units
Temperature Resistance, IEC 60216		134	°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	23°C	112	KV/mm
- After 23 hours water immersion		108	KV/mm
Volume Resistivity, IEC 60464 part 2	23°C	1 x 10^{15}	Ω • cm
Tracking resistance, IEC 60112		600	CTI

Table 5 – Chemical properties of cured coating

Property	Condition	Value	Units
Water absorption, ISO 62	23°, 24 hours	1.4	%
	100°C, 0.5 hour	2.3	%

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