

Product Information

Electronic Protection System

Urethane/Alkyd Thin Film Coating

Bectron[®] PL 4122-P

ELANTAS Europe GmbH
Grossmannstr. 105
20539 Hamburg
Germany
Tel +49 40 78946 0
Fax +49 40 78946 276
bectron.elantas.beck@altana.com
www.elantas.com

Product description

Bectron® PL 4122-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-P meets the latest requirements of electronics, low pin corrosion and fast curing at room temperature or oven cure conditions. Bectron® PL 4122-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. The coating varnish is available in the following grades:

- 3 solids/viscosity levels for each application system:

Bectron® PL 4122-37 P
Bectron® PL 4122-40 P
Bectron® PL 4122-45 P

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-P

- 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 Inspection of coated areas under UV light

Resistance to Harsh Conditions

Electronic components varnished with Bectron® PL 4122-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-P 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-P is optimised for mass production robotic application on equipment systems where the spray is controlled by air flow or similar equipment. It is ready to use, no dilution is needed. 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.

Bectron® PL 4122-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 24h

Accelerated curing 80°C/0,75h

Continuous Oven Curing:

Very short cure times of about 40 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. The coating thickness should be, in cured condition, below 300µm.

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 Bectron® AC 93 or Thinner Bectron® 217 can be used to remove the Bectron® 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 4122-37 P		37 ± 1	%
Bectron® PL 4122-40 P		40 ± 2	%
Bectron® PL 4122-45 P		45 ± 1	%
Viscosity - Rheometric Measurement Method V 18			
Bectron® PL 4122-37 P	23 °C, 400 s ⁻¹	45 ± 5	mPa s
Bectron® PL 4122-40 P	(based on DIN 53019)	76 ± 6	mPa s
Bectron® PL 4122-45 P		220 ± 30	mPa s
Density, DIN EN ISO 2811-2	23°C		
Bectron® PL 4122-37 P		0,86 ± 0,01	g/cm ³
Bectron® PL 4122-40 P		0,87 ± 0,01	g/cm ³
Bectron® PL 4122-45 P		0,89 ± 0,01	g/cm ³
Shelf life	IBC and Drum package	-10°C to 25 °C	6
	Tin package (25 kg and smaller)	0°C to 25°C	6
			Months
Curing Time	23 °C, dust dry	0,5	h
	23 °C, touch dry	2,00	h
	23 °C, cured	24,00	h
	80°C (batch oven)	0,75	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	
Glass transition temperature Tg, IEC 61006	Beck mode	+35°C	°C
Linear expansions coefficient, Beck M56	below Tg	0,8 x 10 ⁻⁴	°K ⁻¹
Linear expansions coefficient, Beck M56	above Tg	2,2 x 10 ⁻⁴	°K ⁻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	1.5	%
	100°C, 0.5 hour	2.5	%

Our advice in application technology given verbally, in writing and by testing corresponds to the best of our knowledge and belief, but is intended as information given without obligo, also with respect to any protective rights held by third parties. It does not relieve you from your own responsibility to check the products for their suitability to the purposes and processes intended. The application, usage and processing of the products are beyond our reasonable control and will completely fall into your scope of responsibility. Should there nevertheless be a case of liability from our side, this will be limited to any damage to the value of the merchandise delivered by us. Naturally, we assume responsibility for the unobjectionable quality of our products, as defined in our General Terms and Conditions