ELANTAS
Electrical Insulation

Product Information

Electronic Protection System

Polyurethane Potting/Encapsulation Resin

Bectron® PU 4501

Hardener Bectron PH 4901

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Product description

Bectron® PU 4501 with hardener Bectron® PH 4901 is a 2 part system which is cured to form a very soft transparent elastic polyurethane plastic.
Bectron® PU 4501 is a solventless clear resin based on polyetherpolyol with no fillers. The associated Hardener Bectron® PH 4901 is a mixture of aliphatic isocyanates.

The low-viscous resin/hardener mixture cures by a polyaddition reaction to give an elastic polyurethane casting resin.

Areas of application

Potting and coating in situations where visibility of the potted material is required.

- Bonded Circuits
- Sensors
- Reed relays
- LED
- SMD-Components of circuit boards (rigid and semi-flexible) and on ceramic substrates

Properties

The resin compound cures with low total volume shrinkage and heat development to give a stress-free, clear cured resin.
The high elasticity ensures an extremely favourable temperature cycling behaviour

Flexible down to -50°C

Good cycling behaviour –40°C/+125°C.

Low shrinkage

Good dielectric properties

Good Adhesion

ROHS Compliant

Storage

Bectron® PU 4501 has good storage stability over the shelf life of 6 months but containers should be kept closed to protect the resin against humidity.
Hardener Bectron® PH 4901 has a shelf life of 4 months. Opened containers of the Hardener Bectron® PH 4901 should be used up as soon as possible because moisture in air reduces reactivity.

The Hardener Bectron® PH 4901 might form crystals at temperatures below 0 °C. Heating the entire contents of the drum for a short time to 70 °C will recover the complete liquid state.

Processing

Pre-treatment: The components to be potted should be clean dry and free from grease. Compatibility between the resin and all materials on a PCB should be checked prior to use.

Preparation: The polyurethane potting compound contains no filler materials and stirring before use is not generally necessary. Any agitation or transfer to the machine storage tank must be carefully carried out to avoid introduction of air bubbles.

Mixing: Bectron® PU 4501 and the Hardeners Bectron® PH 4901 require the specified mixing ratio to be accurate. During the mixing process make sure stirring introduces as little air as possible. Excess hardener may lead to bubbles in the cured resin and possible out-gassing after curing. Excess resin will be incompletely cured. Mixing can be by static or dynamic mixers.

Application: The processing time is about 30 minutes. Within this time, viscosity will increase; therefore, the prepared volume for batch production should be just enough to permit processing in this time. The compound is best processed by casting using two-component metering equipment.

Curing: Recommended curing conditions are:

- at RT 24 hours
- 80°C 1 hours
- 90°C 0.5 hours

When curing at room temperature, moisture must be excluded. Curing does not require pressure assistance. PU compounds cured at Room temperature should not be subjected to mechanical or electrical loads for 3-4 days.

Table 1 - Properties of materials as supplied

Property	**PU 4501**	**PH 4901**	Unit
Colour	Colourless	Colourless	---
Viscosity, 23°C, DIN 53019	800 ± 100	250 ± 150	mPa.s
Density, 23°C, DIN 51757	1,02 ± 0.01	1,09 ± 0.01	g/cm³
Shelf life	6	4	months

Table 2 - Properties of mixture

Property	Condition	Value	Unit
Mixing ratio PU 4501: PH 4901	-	100 : 50	Parts per weight
Process Time	23°C	35 ± 5	min
Isothermal increase of viscosity DIN 16945	23°C, 7500 mPa.s	55 ± 15	min
Density, DIN 51757	23°C	1.04 ± 0.01	g/cm³
Volume Shrinkage* ISO 2811	23°C	2.6	%

Table 3 - Thermal properties of cured compound*

Property	Condition	Value	Unit
Coefficient of thermal expansion, Beck TEST M 56	-20 to 90 °C	160 x 10^{-6}	K^{-1}
Thermal conductivity DIN 52616		0.18 ± 0.02	W/mK
Glass transition temperature IEC 61006		-40	°C

Table 4 - mechanical properties of cured compound*

Property	Condition	Value	Unit
Density ISO 2811/2	23°C	1.04 ± 0,01	g/cm³
Hardness ISO 868	23°C	35 ± 10	Shore A

Table 5- Dielectric properties of cured compound*

Property	Condition	Value	Unit
Volume resistivity IEC 60464-3-2 after water immersion	Initial value 80°C 7 days	10^{13} 10^{11} 10^{12}	Ω • cm Ω • cm
Dielectric strength IEC 60243	23°C 80°C	73 57	kV/mm kV/mm
Tracking IEC 60112	Solution B	CTI>600 M	---
Dielectric dissipation factor IEC 60250	23°C, 300 kHz	0,030	---
Relative permittivity IEC 60250	23°C, 300 kHz	4.0	---

Table 6 - Chemical properties in cured condition*

Property	Condition	Value	Unit
Water absorption ISO 62	24 h at 23°C 0,5 h at 100°C	14 32	mg mg

* sample cured 2h at 90°C

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