

Product Information

Electronic Protection System

Polyurethane Potting/Encapsulation Resin

Bectron[®] PU 4517

Hardener Bectron[®] PH 4912

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Product description

Bectron[®] PU 4517 polyurethane is a two-component liquid polyurethane system.
After curing with the Hardener Bectron[®] PH 4912 it produces a tough moulding compound for small electronic and electrical components.

Areas of application

Bectron[®] PU 4517 is suitable for potting and sealing many types of components.

The physical properties and relatively high thermal resistance make it very suitable also for electronics subject to shock and vibration (e.g. impact drills and automotive electronics) and for sensor technology.

Bectron[®] PU 4517 satisfies the requirements of the ROHS directive.

Properties

A strong elastic potting compound required for mechanically sensitive electric/electronic components.

Room Temperature Cured

Tough elastic cured compound

Good physical properties

Good dielectric properties at high temperature

Low processing viscosity

ROHS compliant

Storage

Containers filled with Bectron[®] PU 4517 should be kept closed to protect the resin against humidity. During longer storage periods of the containers, some settling of the pigments can occur and it is advisable to homogenise the resin by rotation of the containers or effective stirring.

Opened containers of Hardener Bectron[®] PH 4912 should be used up as soon as possible because moisture in air reduces reactivity. The Hardener Bectron[®] PH 4912 might produce crystals at temperatures below 0 °C. Heating the entire contents of the drum for a short time up to 70 °C will recover the complete liquid state.

Processing

Pretreatment: 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: Bectron[®] PU 4517 contains filler materials which tend to settle, depending on storage temperatures. Therefore, thorough stirring is necessary prior to the mixing with the Hardener.

Mixing Bectron[®] PU 4517 and the Hardeners Bectron[®] PH 4912 require the specified mixing ratio. After intensive mixing, the compound is ready for use immediately. During the mixing process make sure stirring introduces as little air as possible.

Application: The processing time is about 50 minutes. Within this time, viscosity will increase; therefore, the prepared volume should be just enough to permit processing in this time. The compound is best processed by potting using two-component metering equipment but manual potting is possible. Shrinkage on curing is about 0.4%.

Curing: Recommended curing conditions are:

- Room Temperature 6 to 8 hours

Curing does not require pressure assistance
PU compounds cured at Room temperature should not be subjected to mechanical and electrical loads before 3-4 days.

Table 1 - Properties of materials as supplied

Property	PU 4517	PH 4912	Units
Colour	Off-white	Brown transparent	
Viscosity 25°C DIN 53019	4500 ± 500	100 ± 30	mPa.s
Spec. gravity 20°C DIN EN ISO 2811-1	1.67 ± 0.05	1.22± 0.03	g/cm ³
Shelf Life	6	6	months

Table 2 - Properties of mixture

Mixing Ratio			
Bectron [®] PU 4517 : Hardener Bectron [®] PH 4912	weight parts volume @20°C	3:1 2.19:1	Parts Parts
Bectron [®] PU 4517 : Hardener Bectron [®] PH 4912			
Viscosity DIN 53019	25°C	1000 ± 300	mPa.s
Process time	25°C	50	Min

Table 3 – Thermal Properties of cured compound

Property	Condition	Value	Units
Glass transition temperature		+72	°C
Linear coefficient of expansion	below tg	70 x 10 ⁻⁶	K ⁻¹
Thermal Range		-40 to +130	°C
Thermal Conductivity DIN 52613		0.45	W/m.K

Table 4 - Mechanical properties of cured compound

Property	Condition	Value	Units
Specific Gravity DIN 16945	20°C	1.54 ± 0.02	g/cm ³
Hardness DIN 53505		79	Shore D
Tensile Strength ISO 527-1		88 ± 4	N/mm ²
Bending Strength (3 point)		200	N/mm ²
Thermal form stability acc. Martens DIN 53458		55	°C

Table 5 – Dielectric properties of cured compound

Property	Condition	Value	Units
Volume resistivity DIN 53482	20 °C/40°C	9.4/1.7 x 10 ¹⁴	Ω • cm
	60°C/80°C	5.0/4.9 x 10 ¹³	
Dielectric Constant ε _r DIN 53483	20 °C/50 Hz	3.4	
	50°C/50Hz	3.8	
	100°C/50Hz	4.6	
Dielectric loss factor tan-δ	20°C/ 50 Hz	0.004	
	40°C/50 Hz	0.007	
	60°C/50 Hz	0.025	
Dielectric Strength DIN 53481	20 °C/60°C	28/20	kV/mm
Tracking resistance IEC 112		600	

Table 6 - Chemical properties of cured compound

Property	Condition	Value	Units
Water absorption DIN 53472	30 days, 23°C	0.25	%

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