ELANTAS
Electrical Insulation

Product Information

Electronic Protection System

Polyurethane Potting/Encapsulation Resin

Bectron® PU 4513

Hardener Bectron PH 4912

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Product description

Bectron® PU 4513 is a soft, elastic polyurethane with low shrinkage, excellent insulation properties and provides good mechanical and chemical protection. It is suitable for potting sensitive components and PCBs for outdoor applications.

It is cured with the Hardener Bectron® PH 4912.

The system meets the requirement of ROHS.

Areas of application

The Bectron® PU 4513 system is used for potting electronic components sensitive to mechanical or thermal stress.

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

Properties

Bectron® PU 4513 is a soft, elastic potting polyurethane compound for the potting of sensitive electronic components and assembled PCBs

High sub-zero flexibility to -40 °C

Good dielectric properties

Room temperature curing

Heat curing

Good thermal conductivity

Solvent-free

ROHS compliant

Storage

Containers filled with Bectron® PU 4513 should be kept closed to protect the resin from humidity.
During longer storage periods some settling of the pigments can occur and stirring of the containers prior to filling storage or service tanks is needed.
Opened containers of the 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

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

Preparation: The polyurethane potting compound contains filler materials that tend to settle to some degree. Very thorough stirring without introduction of air is recommended in machine storage tanks prior to the mixing process.

Mixing Bectron® PU 4513 and the Hardener Bectron® PH 4912 require the specified mixing ratio to be accurate. During mixing any stirring should introduce 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.

Application: The processing time is about 50 minutes. Within this time, viscosity will increase; the prepared volume for batch production should be just enough to permit processing in this time. If the Bectron® PU 4513 system is produced in metering equipment, it is possible to shorten the setting time with accelerators.

Curing: Recommended curing conditions are:

- at RT 24 hours
- 90 °C 1-1.5 hours

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 to allow full properties to develop.

Table 1 - Properties of materials as supplied

Property	PU 4513	PH 4912	Units
Colour	Dark Blue	Brown, transparent	
Viscosity 25°C DIN 53019	1150 ± 150	100 ± 30	mPa.s
Density 20°C DIN EN ISO 2811-1	1.40 ± 0.05	1.22 ± 0.03	g/cm^3
Shelf Life	6	6	months

Table 2 - Properties of mixture

Property			
Mix Ratio: PU 4513 : PH 4912	4.0 3.5	1 1	Parts by weight Parts by volume @20°C
Viscosity DIN 53019	25°C	750 ± 150	mPa.s
Process time	25°C	50	Min

Table 3 – Thermal Properties of cured compound

Property	Condition	Value	Units
Thermal Conductivity DIN 52613		0.36	W/m.K
Glass transition temperature IEC 61006		-10	°C
Thermal class IEC 216	% weight loss	115	°C
Linear coefficient of expansion	below tg above tg	98×10^{-6} 216×10^{-6}	K^{-1}
Glow wire test/ flammability index (GWFI) IEC 695-2-1/2		650/5.0	°C

Table 4 - Mechanical properties of cured compound

Property	Condition	Value	Units
Specific Gravity DIN 16945	20°C	1.36 ± 0.02	g/cm^3
Hardness ISO 868		75	Shore A
Tensile Strength DIN 53455/457		2.5	MPa
E-Modulus DIN EN ISO 527-1		7	MPa
Elongation at break DIN EN ISO 527-1		75	%

Table 5 – Dielectric properties of cured compound

Property	Condition	Value	Units
Volume resistivity IEC 60455 Part 2	20 °C	2.0×10^{13}	Ω • cm
Surface resistance DIN 53482	20 °C	3.6×10^{12}	Ω
Dielectric Constant ε_r IEC 60250	20 °C/50 Hz	4.2	
Dielectric Strength IEC 60250	20 °C		kV/mm
Tracking resistance IEC 60112		600	CTI

Table 6 - Chemical properties of cured compound

Property	Condition	Value	Units
Water absorption ISO 62	24h RT	0.36	%

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