

Product Information

Electronic Protection System
Polyurethane Potting/Encapsulation Resin

Bectron[®] PU 4518

Hardener Bectron PH 4912

Flexible flame retardant (UL 94 V2) polyurethane, class B

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Product Description

Bectron[®] PU 4518 with hardener Bectron[®] PH 4912 produces a flexible casting compound with flame retardant properties.

The system meets the requirement of ROHS.

Areas of Application

Bectron[®] PU 4518 has elastic properties suitable for casting of pressure sensitive components such as those in radio frequency suppressors, ferrite cores sensors where self extinguishing according to UL 94. For this Bectron[®] PU 4518 has no halogen or antimony or phosphorous containing materials in the formulation and creates no difficulty in relation to the end of life disposal under the WEEE directive.

The material can be used for railway vehicles (standard NF F 16-101).

Properties

- Flexible casting compound
- Low Shrinkage
- Recognised acc. to UL94 V2 (file E 140720)
- Low processing viscosity
- Good dielectric properties
- Good adhesion
- Low temperature flexibility to -40°C
- Insulating Material Class B (130°C)

Storage

Containers filled with Bectron[®] PU 4518 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 Methods

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 4518 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 150 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 4518 system is produced in metering equipment, it is possible to shorten the setting time with accelerators.

Curing: Recommended curing conditions are:

- at RT 12-16 hours
- 60 °C 1-2 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. To reduce this time post curing at 80°C for 12-16 hours is possible.

Table 1 - Properties of materials as supplied

Property	PU 4518	PH 4912	Units
Colour	grey	Brown transparent	
Viscosity 25°C DIN 53019	3600 ± 1000	110 ± 30	mPa.s
Viscosity 25°C IO-10-50 (0,17/1,7 s ⁻¹)	9000/4500	-/140	mPa s
Spec. gravity 20°C DIN EN ISO 2811-1	1.47 ± 0.05	1.23 ± 0.03	g/cm ³
Shelf Life	6	6	months

Table 2 - Properties of mixture

Property	PU 4518	PH 4912	Units
Mix Ratio: PU 4518 : PH 4912	100 5.58	15 1	Parts by weight Parts by volume @20°C
Viscosity DIN 53019	25°C	2900 ± 1000	mPa.s
Process time	23°C	150	min

Table 3 – Thermal Properties of cured compound

Property	Condition	Value	Units
Thermal Conductivity DIN 52613		0.58	W/m.K
Glass transition temperature IEC 61006		-5	°C
Thermal class IEC 216	Tensile strength	135	°C
Linear coefficient of expansion Beck Test M 56	below tg	x 10 ⁻⁶	K ⁻¹
Classification d. use in railway vehicles NF F 16-101 Fire gas analysis + smoke gas haze Oxygen index + glow wire test		Class F1 Class I4	

Table 4 - Mechanical properties of cured compound

Property	Condition	Value	Units
Specific Gravity DIN 16945	20°C	1.44 ± 0.05	g/cm ³
Hardness ISO 868		70 ± 10	Shore A
Tensile Strength DIN EN ISO 527-1	23°C	3.08	MPa
E-Modulus DIN EN ISO 527-1	23°C	21,3	MPa
Elongation at break DIN EN ISO 527-1	23°C	21	%

Table 5 – Dielectric properties of cured compound

Property	Condition	Value	Units
Volume resistivity IEC 60455 Part 2	23 °C	1.2 x 10 ¹⁴	Ω • cm
Dielectric Constant ε _r IEC 60250	23 °C/50 Hz	4.2	
Dielectric Strength IEC 60455 Part 2	23 °C/50%rh	25	kV/mm
Dissipation factor tan-δ IEC 60250	.50Hz/23°C/50%rh	0,1782	
	.1KHz/23°C/50%rh	0,1219	
	1MHz/23°C/50%rh	0,0731	

Table 6 - Chemical properties of cured compound

Property	Condition	Value	Units
Water absorption ISO 62	24h RT	0.15	%

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