ELANTAS
Electrical Insulation

## Product Information

Electronic Protection System

**Polyurethane Potting/Encapsulation Resin**

# Bectron® PU 4512

**Hardener Bectron PH 4912**

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## Product description

Bectron® PU 4512 is a soft elastic polyurethane with low shrinkage, with excellent insulation properties and provides good mechanical and chemical protection, with enhanced adhesion for difficult surfaces.

It is cured with the Hardener Bectron® PH 4912.

The system meets the requirement of ROHS.

## Areas of application

The Bectron® PU 4512 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 also for electronics subject to shock and vibration (e.g. impact drills and automotive electronics) and for sensor technology.

## Properties

Bectron® PU 4512 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 Adhesion

Good dielectric properties

Room temperature curing

Heat curing

Low shrinkage

ROHS compliant

## Storage

Containers filled with Bectron® PU 4512 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 4512 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 40 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 4512 system is produced in metering equipment, it is possible to shorten the setting time with accelerators.

**Curing:** Recommended curing conditions are:

- at RT 36 hours
- 90 °C 1 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 4512 | PH 4912 | Units |
|---|---|---|---|
| Colour | Brownish red | Brown trans-parent | |
| Viscosity 25°C DIN 53019 | 1450 ± 200 | 100 ± 30 | mPa.s |
| Spec. gravity 20°C DIN EN ISO 2811-1 | 1.27 ± 0.05 | 1.22 ± 0.03 | g/cm$^3$ |
| Shelf Life | 6 | 6 | months |

### Table 2 - Properties of mixture

| Property | | | |
|---|---|---|---|
| Mix Ratio: PU 4512 : PH 4912 | 100<br>4 | 24<br>1 | Parts by weight<br>Parts by volume<br>@20°C |
| Viscosity DIN 53019 | 25°C | 900 ± 150 | mPa.s |
| Process time | 25°C | 40 | Min |

### Table 3 – Thermal Properties of cured compound

| Property | Condition | Value | Units |
|---|---|---|---|
| Thermal Conductivity DIN 52613 | | 0.35 | W/mK |
| Glass transition temperature IEC 61006 | | -5 | °C |
| Temperature Index IEC 216 | 2.5 % | 110 | °C |

### Table 4 - Mechanical properties of cured compound

| Property | Condition | Value | Units |
|---|---|---|---|
| Specific Gravity DIN 16945 | 20°C | 1.26 ± 0.02 | g/cm$^3$ |
| Hardness ISO 868 | | 70 ± 10 | Shore A |
| Tensile Strength DIN 53455/457 | | 4.5 | MPa |

### Table 5 – Dielectric properties of cured compound

| Property | Condition | Value | Units |
|---|---|---|---|
| Volume resistivity IEC 60455 Part 2 | 20 °C<br>50°C | 2.2 x 10$^{13}$<br>1.6 x 10$^{14}$ | Ω • cm<br>Ω • cm |
| Surface resistance DIN 53482 | 20 °C | 3.6 x 10$^{12}$ | Ω |
| Dielectric Constant $\varepsilon_r$ IEC 60250 | 20 °C/50 Hz<br>50°C/50 Hz | 4.2<br>>6.0 | |
| Dielectric Strength IEC 60250 | 20 °C<br>100 °C | 20<br>18 | kV/mm<br>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 | 0.8 | % |