

## Product Information

Electronic Protection System

**Polyurethane Potting/Encapsulation Resin**

**Bectron<sup>®</sup> PU 4522**

Hardener Bectron<sup>®</sup> PH 4912

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## Product description

Bectron® PU 4522 polyurethane is a two-component liquid polyurethane system.

After curing with the Hardener Bectron® PH 4912 it produces a tough elastic moulding compound which meets UL 94 V0 standard of flame resistance.

## Areas of application

Bectron® PU 4522 is suitable for potting and sealing many types of electronic components such as assembled PCBs.

Bectron® PU 4522 is flame-retardant to meet the standard UL 94 V0.

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. Temperature range of application – 40 °C to 125 °C.

Bectron® PU 4522 satisfies the requirements of the ROHS directive.

## Properties

A resilient elastic potting compound for mechanically sensitive electric/electronic components and assembled PCBs

Flame Retardant to UL94 V0

Room Temperature Cured

Tough elastic cured compound

Favourable processing viscosity

ROHS compliant

## Storage

Containers filled with Bectron® PU 4522 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 4522 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 4522 and the Hardener 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 20 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 1%.

**Curing:** Recommended curing conditions are:

- Room Temperature 6-8 hours
- accelerated @ 90°C 0.5 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 4522        | PH 4912           | Units             |
|--------------------------------------|----------------|-------------------|-------------------|
| Colour                               | Natural, Beige | Brown transparent |                   |
| Viscosity 25°C DIN 53019             | 3500 ± 300     | 100 ± 30          | mPa.s             |
| Spec. gravity 20°C DIN EN ISO 2811-1 | 1.50 ± 0.05    | 1.22 ± 0.03       | g/cm <sup>3</sup> |
| Shelf Life                           | 6              | 6                 | Months            |

**Table 2 - Properties of mixture**

| Property                     | PU 4522    | PH 4912    | Units                                    |
|------------------------------|------------|------------|--|
| Mix Ratio: PU 4522 : PH 4912 | 100<br>5.4 | 15<br>1    | Parts by weight<br>Parts by volume @20°C |
| Viscosity DIN 53019          | 25°C       | 1800 ± 300 | mPa.s                                    |
| Process time                 | 25°C       | 15-20      | Min                                      |

**Table 3 – Thermal Properties of cured compound**

| Property                                       | Condition | Value                  | Units           |
|--|-----------|------------------------|-----------------|
| Flammability                                   |           | UL 94 V0               |                 |
| Glass transition temperature IEC 61006         |           | -22                    | °C              |
| Linear coefficient of expansion Beck Test M 56 | above tg  | 140 x 10 <sup>-6</sup> | K <sup>-1</sup> |
| Thermal Conductivity DIN 52613                 |           | 0.50                   | W/mK            |

**Table 4 - Mechanical properties of cured compound**

| Property                                 | Condition | Value       | Units             |
|--|-----------|-------------|-------------------|
| Specific Gravity DIN 16945               | 20°C      | 1.46 ± 0.02 | g/cm <sup>3</sup> |
| Hardness ISO 868                         |           | 85 ± 5      | Shore A           |
| Tensile Modulus DIN EN ISO 527-1         | 23 °C     | 22,7        | MPa               |
| Tensile Strength DIN EN ISO 527-1        | 23 °C     | 2,3         | MPa               |
| Tensile Stress at break DIN EN ISO 527-1 | 23 °C     | 3,8         | MPa               |
| Elongation at break DIN EN ISO 527-1     | 23 °C     | 22          | %                 |

**Table 5 – Dielectric properties of cured compound**

| Property                                     | Condition   | Value                  | Units  |
|--|-------------|------------------------|--------|
| Volume resistivity IEC 60455 Part 2          | 20 °C       | 3.1 x 10 <sup>13</sup> | Ω • cm |
| Dielectric Constant ε <sub>r</sub> IEC 60250 | 20 °C/50 Hz | 5.3                    |        |
| Dielectric loss factor tan-δ IEC 60250       | 25°C, 50 Hz | 0.061                  |        |
| Dielectric Strength IEC 60455 Part 2         | 20 °C       | 18                     | kV/mm  |
| Tracking resistance IEC 60112                |             | 600                    | CTI    |

**Table 6 - Chemical properties of cured compound**

| Property                | Condition      | Value | Units |
|-------------------------|----------------|-------|-------|
| Water absorption ISO 62 | 24 hours, 23°C | 0.4   | %     |
|                         | 7 days, 23°C   | 1.1   | %     |

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