

EN

Technical Data Sheet

Bectron®

PB 4540/PH 4940

100:10

Polyurethane Adhesive
Self-extinguishing

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Product description

- Two components elastomeric filled system
- Self-extinguishing
- Very good electrical properties
- Good thermal resistance
- Low water absorption and moisture transmission
- Good adhesion to glass, ceramics, plastic materials and metals
- Good resistance to oils, greases and diesel fuel
- The cured system is flexible and maintains its flexibility also at very low temperature
- The system is UL 94 V-0 listed (File E116643)

Areas of application

Encapsulation of: electrical and electronic components and PCBs, components particularly sensitive to thermo-mechanical stress. The high chemical resistance will give protection from humid, alkaline and acidic environments. Sealings.

Processing methods

- Manual and/or automatic casting/potting
- Under vacuum casting/potting
- Room temperature curing

In pre-filled products, before each use, always check for presence of possible sediment. In case, re-homogenize thoroughly. Add the appropriate quantity of hardener and mix carefully. Avoid excessive air trapping when mixing single or combined components. For particular applications it can be useful to pre-heat components and/or remove entrapped air from the mixture before casting with a vacuum step.

Curing/Post-curing

For a room temperature curing system, post-curing allows fast stabilization of the material and attainment of the best electrical and mechanical properties. During curing process it is advisable to avoid thermal variations higher than 10 °C/hour.

Storage and stability

Polyol and isocyanate based hardener can be stored for one year in the original sealed containers stored in a cool, dry place. Resin and hardener are chemically stable. Avoid storage outside. Hardener may increase its viscosity over

storage time without changing final cured system properties. Store between 5 °C and 35 °C. Long storage may cause filler settling. Mix each component before using. Both components are moisture sensitive therefore it is good practice to close the vessels immediately after each use. Moisture absorption may cause the expansion of the product during application and/or may cause the hardener to form solid residues. Hardener can crystallize if exposed at low temperature. To restore the original conditions, material can be heated at 70-80 °C avoiding local overheating. Product must be homogenized and cooled down at room temperature before using.

Handling precautions

Refer to the safety data sheet and comply with regulations relating to industrial health and waste disposal.

Sales specifications

PB 4540

| Properties | Conditions | Test Method | Value | M/U |
|------------|----------------|------------------------|-------------|-------|
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 5000 ÷ 7500 | mPa·s |
| Density | 25 °C | IO-10-51 (ASTM D 1475) | 1,42 ÷ 1,46 | g/ml |
| Gel time | 25 °C - 100 ml | IO-10-52a | 10 ÷ 15 | min |

PH 4940

| Properties | Conditions | Test Method | Value | M/U |
|------------|------------|---------------------|----------|-------|
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 80 ÷ 160 | mPa·s |

Typical product properties

PB 4540

| Properties | Conditions | Test Method | Value | M/U |
|------------|------------|------------------------|---------------|-------|
| Colour | | -- | Neutral/Black | |
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 5000 ÷ 7500 | mPa·s |
| Density | 25 °C | IO-10-51 (ASTM D 1475) | 1,42 ÷ 1,46 | g/ml |

PH 4940

| Properties | Conditions | Test Method | Value | M/U |
|------------|------------|------------------------|-------------|-------|
| Colour | | -- | Amber | |
| Viscosity | 25 °C | IO-10-50 (ISO 3219) | 80 ÷ 160 | mPa·s |
| Density | 25 °C | IO-10-51 (ASTM D 1475) | 1,08 ÷ 1,11 | g/ml |

Typical system properties

| Properties | Conditions | Test Method | Value | M/U |
|---------------------------|----------------------|---------------------|----------------------|-------|
| Mix Ratio by weight | | -- | 100 : 10 | g |
| Mix Ratio by volume | | -- | 100 : 14 | ml |
| Initial mixture viscosity | 25 °C | IO-10-50 (ISO 3219) | 2400 ÷ 3400 | mPa·s |
| Pot life | 25 °C - 25000 mPa·s | IO-10-50 (ISO 3219) | 7 ÷ 9 | min |
| Gel time | 25 °C - 100 ml | IO-10-52a | 10 ÷ 15 | min |
| Gel time (manual test) | 25 °C - 6 mm | IO-10-73 (*) | 40 ÷ 50 | min |
| | 60 °C - 6 mm | | 13 ÷ 17 | min |
| Demoulding time | 25 °C - 15 ml - 6 mm | (*) | 80 ÷ 100 | min |
| | 60 °C - 15 ml - 6 mm | | 22 ÷ 28 | min |
| Post-curing | 60 °C | (**) | 15 | hrs |
| Suggested curing cycles | | (**) | 24 h RT + 15 h 60 °C | |

Typical cured system properties

| Properties | Conditions | Test Method | Value | M/U |
|---|------------|----------------------------|----------------------|------------|
| Specimens curing cycle | | -- | 24 h RT + 15 h 60 °C | |
| Density (solid) | 25 °C | IO-10-54 (ASTM D 792) | 1,39 ÷ 1,43 | g/ml |
| Hardness | 25 °C | IO-10-58 (ASTM D 2240) | 40 ÷ 45 | Shore A/15 |
| | -20 °C | | 42 ÷ 46 | Shore A/15 |
| | -40 °C | | 45 ÷ 50 | Shore A/15 |
| Glass Transition (T _g) | -- | IO-10-69 (ASTM D 3418) | -50 | °C |
| Maximum T _g | -- | IO-10-69 (ASTM D 3418) | nd | °C |
| Water absorption (24 h RT) | | IO-10-70 (ASTM D 570) | 0,10 ÷ 0,15 | % |
| Water absorption (2 h 100 °C) | | IO-10-70 (ASTM D 570) | 0,55 ÷ 0,70 | % |
| Linear thermal exp. (T _g -10 °C) | | IO-10-71 (ASTM E 831) | na | ppm/°C |
| Linear thermal exp. (T _g +10 °C) | | IO-10-71 (ASTM E 831) | 190 ÷ 220 | ppm/°C |
| Flammability | | IO-10-68 (UL 94 V-0) | 5,5 | mm |
| Thermal conductivity | 25 °C | IO-10-87 (ASTM C 518) | 0,45 ÷ 0,55 | W/(m·K) |
| Thermal shock (n° 10 cycles passed) | | IO-10-67 (Olyphant washer) | -55 ÷ +180 | °C |
| Max recommended operating temperature | | IEC 60085 (***) | 125 | °C |

Typical mechanical properties in cured condition

| Properties | Conditions | Test Method | Value | M/U |
|--------------------------|------------|-----------------------|----------------------|-------------------|
| Specimens curing cycle | | -- | 24 h RT + 15 h 60 °C | |
| Flexural strength | 25 °C | IO-10-66 (ASTM D 790) | na | MN/m ² |
| Strain at maximum stress | 25 °C | IO-10-66 (ASTM D 790) | na | % |
| Strain at break | 25 °C | IO-10-66 (ASTM D 790) | na | % |
| Flexural elastic modulus | 25 °C | IO-10-66 (ASTM D 790) | na | MN/m ² |
| Tensile strength | 25 °C | IO-10-63 (ASTM D 638) | 0,6 ÷ 1,0 | MN/m ² |
| Nominal strain at break | 25 °C | IO-10-63 (ASTM D 638) | 65 ÷ 95 | % |
| Compressive strength | 25 °C | IO-10-72 (ASTM D 695) | na | MN/m ² |

Typical dielectric properties in cured condition

| Properties | Conditions | Test Method | Value | M/U |
|------------------------|--------------|-----------------------|---|-------------------|
| Specimens curing cycle | | -- | 24 h RT + 15 h 60 °C | |
| Tracking Index | | IEC 60112 | nd | CTI |
| Dielectric constant | 25 °C | IO-10-59 (ASTM D 150) | 3,5 ÷ 5,0 | |
| Loss factor | 25 °C | IO-10-59 (ASTM D 150) | 15 ÷ 20 | x10 ⁻³ |
| Volume resistivity | 25 °C | IO-10-60 (ASTM D 257) | 1 x 10 ¹² ÷ 1 x 10 ¹³ | Ω·cm |
| Dielectric strength | 25 °C - 2 mm | IO-10-61 (ASTM D 149) | 19 ÷ 21 | kV/mm |

IO-00-00 = Elantas Europe internal test method. The correspondent international method is indicated whenever possible; nd = not determined; na = not applicable; RT = TA = laboratory room temperature (23±2°C); conversion units: 1 mPas = 1 cPs 1MN/m² = 10 kg/cm² = 1 MPa

(*) for larger quantities pot life is shorter and exothermic peak increases; (**) the brackets mean optionality; (***) the maximum operating temperature is given on the basis of laboratory information available being it function of the curing conditions used and of the type of coupled materials. For further possible information see post-curing paragraph.

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