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Technical Data Sheet

Bectron®

PU 4501/PH 4901

100:50

Two component unfilled polyurethane system

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Product description

Bectron® PU 4501 with hardener Bectron® PH 4901 is a 2 part system which is cured to form a very soft transparent elastic polyurethane plastic. Bectron® PU 4501 is a solventless clear resin based on polyetherpolyol with no fillers. The associated Hardener Bectron® PH 4901 is a mixture of aliphatic isocyanates. The low-viscous resin/hardener mixture cures by a polyaddition reaction to give an elastic polyurethane casting resin.

Areas of application

Potting and coating in situations where visibility of the potted material is required like Bonded Circuits, Sensors, Reed relays, SMD-Components of circuit boards (rigid and semi-flexible) and on ceramic substrates Properties. The resin compound cures with low total volume shrinkage and heat development to give a stress free, clear cured resin. The high elasticity ensures an extremely favorable temperature cycling behavior flexible down to -50 °C.

Processing methods

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

Add the appropriate quantity of hardener to the resin and mix carefully. Avoid excessive air trapping when mixing components. To avoid the presence of bubbles on the cured device it can be useful to de-hydrated the components before potting and remove entrapped air from the mixture 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

Refer to the safety data sheet regarding conditions for safe storage. Polyol and the isocyanate based hardener must be stored in the original sealed containers stored in a cool, dry place. The resin and hardener are chemically stable. Avoid storage outside. The hardener may increase its viscosity over storage time without changing final cured system properties. Long storage may cause filler settling. Mix each component before use. Both components are moisture sensitive therefore it is good practice to close the containers 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 temperatures. To restore the original conditions, heat the material at 70-80°C avoiding local overheating. Before use, the product must be homogenized and cooled down at room temperature.

Handling precautions

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

Sales specifications

PU 4501

Properties	Conditions	Test Method	Value	M/U
Viscosity	25 °C	IO-10-50 (ISO 3219)	600 ÷ 900	mPa·s
Gel time	40 °C - 100 ml	IO-10-52b	50 ÷ 60	min

PH 4901

Properties	Conditions	Test Method	Value	M/U
Viscosity	25 °C	IO-10-50 (ISO 3219)	250 ÷ 450	mPa·s

Typical product properties

PU 4501

Properties	Conditions	Test Method	Value	M/U
Colour		--	Neutral	
Density	25 °C	IO-10-51 (ASTM D 1475)	0,99 ÷ 1,03	g/ml

PH 4901

Properties	Conditions	Test Method	Value	M/U
Colour		--	Colorless	
Density	25 °C	IO-10-51 (ASTM D 1475)	1,08 ÷ 1,12	g/ml

Typical system properties

Properties	Conditions	Test Method	Value	M/U
Mix Ratio by weight		--	100 : 50	g
Mix Ratio by volume		--	100 : 34	ml
Initial mixture viscosity	25 °C	IO-10-50 (ISO 3219)	300 ÷ 600	mPa·s
	40 °C		250 ÷ 450	mPa·s
Pot life (doubled initial viscosity)	25 °C	IO-10-50 (ISO 3219) (*)	30 ÷ 45	min
	40 °C		25 ÷ 35	min
Gel time	25 °C - 100 ml	IO-10-52a	50 ÷ 70	min
Gel time (manual test)	25 °C - 6 mm	IO-10-73 (*)	2 ÷ 3	hrs
Demoulding time	25 °C - 15 ml - 6 mm	(*)	4 ÷ 8	hrs
Post-curing	60 °C	(**)	15	hrs
Suggested curing cycle		(**)	24 h RT + 15 h 60 °C	

Typical cured system properties

Properties	Conditions	Test Method	Value	M/U
Density (solid)	25 °C	IO-10-54 (ASTM D 792)	1,04 ÷ 1,08	g/ml
Hardness	25 °C	IO-10-58 (ASTM D 2240)	25 ÷ 40	Shore A/15
Glass Transition (Tg)		IO-10-69 (ASTM D 3418)	- 40 ÷ - 20	°C
Water absorption (24 h RT)		IO-10-70 (ASTM D 570)	1,5 ÷ 2,0	%
Linear thermal exp. (Tg +10 °C)		IO-10-71 (ASTM E 831)	220 ÷ 260	ppm/°C
Thermal conductivity	25 °C	IO-10-87 (ASTM C 518)	0,15 ÷ 0,25	W/(m·K)
Operating Temperature Range		--	-50/130 °C	°C

Typical mechanical properties in cured condition

Properties	Conditions	Test Method	Value	M/U
Tensile strength	25 °C	IO-10-63 (ASTM D 638)	0,30 ÷ 0,50	MN/m ²
Tensile elastic modulus	25 °C	IO-10-63 (ASTM D 638)	1,0 ÷ 4,0	MN/m ²
Elongation at break	25 °C	IO-10-63 (ASTM D 638)	25 ÷ 40	%

Typical dielectric properties in cured condition

Properties	Conditions	Test Method	Value	M/U
Tracking Index		IEC 60112	> 600	CTI
Dielectric constant	25 °C	IO-10-59 (ASTM D 150)	6,0 ÷ 8,0	
Loss factor	25 °C	IO-10-59 (ASTM D 150)	120 ÷ 180	x10 ⁻³
Volume resistivity	25 °C	IO-10-60 (ASTM D 257)	5,0 x10 ¹⁰ ÷ 5,0 x10 ¹¹	Ω·cm
Dielectric strength	25 °C - 2 mm	IO-10-61 (ASTM D 149)	18 ÷ 22	kV/mm

Specimens curing cycle = 24 h RT + 15 h 60 °C

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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