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Technical Data Sheet

Bectron®

PU 4515/PH 4912

100:20

Polyurethane - Two Components Filled

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Product description

Two components elastomeric polybutadiene system with non-abrasive fillers.

- Excellent electrical properties
- High thermal resistance
- Good adhesion to glass, ceramic, metallic and plastic materials
- Free of Solvents, and halogenated organic compounds
- Cured system is flexible and maintains its flexibility also at very low temperature
- Low water absorption and moisture permeability

Areas of application

Encapsulation of electronical components particularly sensitive to thermo-mechanical stress.

Processing methods

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

The liquid resin Bectron PU 4515 shall be used in combination with the hardener Bectron PH 4912. The resin shall be checked for possible sediments before use and - if necessary - rehomogenized prior to mixing. The hardener shall be added in the appropriate quantity to the resin and mixed carefully. Avoid excessive air trapping when mixing components. It can be useful to pre-heat components and remove entrapped air from the mixture with a vacuum step before casting.

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 4515

Properties	Conditions	Test Method	Value	M/U
Viscosity	25 °C	IO-10-50 (ISO 3219)	6000 ÷ 12000	mPa·s
Density	25 °C	IO-10-51 (ASTM D 1475)	1,09 ÷ 1,15	g/ml

PH 4912

Properties	Conditions	Test Method	Value	M/U
Viscosity	25 °C	IO-10-50 (ISO 3219)	90 ÷ 140	mPa·s

Typical product properties

PU 4515

Properties	Conditions	Test Method	Value	M/U
Colour		--	Beige	

PH 4912

Properties	Conditions	Test Method	Value	M/U
Colour		--	Amber	
Density	25 °C	IO-10-51 (ASTM D 1475)	1,20 ÷ 1,22	g/ml

Typical system properties

Properties	Conditions	Test Method	Value	M/U
Mix Ratio by weight		--	100 : 20	g
Mix Ratio by volume		--	100 : 19	ml
Initial mixture viscosity	25 °C	IO-10-50 (ISO 3219)	5300 ÷ 6300	mPa·s
	40 °C		3000 ÷ 3800	mPa·s
Pot life (doubled initial viscosity)	25 °C	IO-10-50 (ISO 3219) (*)	15 ÷ 22	min
	40 °C		10 ÷ 16	min
Gel time	25 °C - 100 ml	IO-10-52a	30 ÷ 40	min
Gel time	40 °C - 100 ml	IO-10-52b	20 ÷ 30	min
	60 °C - 100 ml		10 ÷ 20	min
Gel time (manual test)	25 °C - 6 mm	IO-10-73 (*)	1 ÷ 2	hrs
Demoulding time	25 °C - 15 ml - 6 mm	(*)	5 ÷ 7	hrs
Post-curing	60 °C	(**)	10-15	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)	1,08 ÷ 1,14	g/ml
Hardness	25 °C	IO-10-58 (ASTM D 2240)	65 ÷ 75	Shore A/15
Glass Transition (Tg)		IO-10-69 (ASTM D 3418)	< -60	°C
Water absorption (24 h RT)		IO-10-70 (ASTM D 570)	0,30 ÷ 0,40	%
Linear thermal exp. (Tg +10 °C)		IO-10-71 (ASTM E 831)	180 ÷ 200	ppm/°C
Thermal conductivity	25 °C	IO-10-87 (ASTM C 518)	0,20 ÷ 0,30	W/(m·K)
Operating Temperature Range		--	-50/130	°C

Typical mechanical properties in cured condition

Properties	Conditions	Test Method	Value	M/U
Strain at maximum stress	25 °C	IO-10-66 (ASTM D 790)	2 ÷ 5	%
Strain at break	25 °C	IO-10-66 (ASTM D 790)	90 ÷ 120	%
Tensile strength	25 °C	IO-10-63 (ASTM D 638)	2 ÷ 5	MN/m ²
Tensile elastic modulus	25 °C	IO-10-63 (ASTM D 638)	5 ÷ 15	MN/m ²
Elongation at break	25 °C	IO-10-63 (ASTM D 638)	100 ÷ 130	%

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)	3,0 ÷ 4,0	
Loss factor	25 °C	IO-10-59 (ASTM D 150)	15 ÷ 30	x10 ⁻³
Volume resistivity	25 °C	IO-10-60 (ASTM D 257)	5,0 x10 ¹⁴ ÷ 5,0 x10 ¹⁵	Ω·cm
Dielectric strength	25 °C - 2 mm	IO-10-61 (ASTM D 149)	20 ÷ 25	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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