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ELANTAS

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Preliminary Technical Data Sheet

ELAN-tim®

CU 13 AV 0052/CU 13 AV 0063

100:10

Polyurethane - Two Components Filled
High Thermal Conductivity - Flexible

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Product description

ELAN-tim® CU 13 AV 0052/CU 13 AV 0063 polyurethane is a two-component liquid polyurethane system. After curing with the Hardener ELAN-tim® CU 13 AV 0063 it produces an encapsulating compound which meets UL 94 V-0 standard of flame resistance. Thermally conductive materials act as a thermal 'connection' between a heat source of an electronic device and a housing of the device, improving the overall efficiency.

Areas of application

ELAN-tim® CU 13 AV 0052/CU 13 AV 0063 is suitable for encapsulating of parts subject to different coefficient of thermal expansion, with the need of thermal conductivity. ELAN-tim® CU 13 AV 0052/CU 13 AV 0063 can be used for telecom equipment, lighting assemblies, consumer electronics, power components for automotive and other industries.

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 to the resin and mix 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

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.

Typical product properties

CU 13 AV 0052

Properties	Conditions	Test Method	Value	M/U
Colour		--	Black	
Viscosity	25 °C	IO-10-50 (ISO 3219)	70000 ÷ 80000	mPa·s
	40 °C		45000 ÷ 55000	mPa·s
	60 °C		30000 ÷ 40000	mPa·s
Density	25 °C	IO-10-51 (ASTM D 1475)	1,84 ÷ 1,90	g/ml

CU 13 AV 0063

Properties	Conditions	Test Method	Value	M/U
Colour		--	Amber	
Viscosity	25 °C	IO-10-50 (ISO 3219)	40 ÷ 70	mPa·s
Density	25 °C	IO-10-51 (ASTM D 1475)	1,12 ÷ 1,16	g/ml

Typical system properties

Properties	Conditions	Test Method	Value	M/U
Mix Ratio by weight		--	100 : 10	g
Mix Ratio by volume		--	100 : 17	ml
Initial mixture viscosity	25 °C	IO-10-50 (ISO 3219)	5200 ÷ 6200	mPa·s
	40 °C		2800 ÷ 3300	mPa·s
	60 °C		1200 ÷ 1800	mPa·s
Pot life (doubled initial viscosity)	25 °C	IO-10-50 (ISO 3219) (*)	45 ÷ 55	min
	40 °C		25 ÷ 35	min
	60 °C		12 ÷ 18	min
Gel time	40 °C - 100 ml	IO-10-52b	125 ÷ 150	min
	60 °C - 100 ml		70 ÷ 80	min
Gel time (manual test)	25 °C - 30 ml - 6 mm	IO-10-73 (*)	8 ÷ 10	hrs
Post-curing	60 °C	(**)	15	hrs
Suggested curing cycles		(**)	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)	1,71 ÷ 1,77	g/ml
Hardness	25 °C	IO-10-58 (ASTM D 2240)	85 ÷ 95	Shore A/15
Hardness	25 °C	IO-10-58 (ASTM D 2240)	30 ÷ 40	Shore D/15
Glass Transition (Tg)	24 h RT + 15 h 60 °C	IO-10-69 (ASTM D 3418)	-60 ÷ -50	°C
Maximum Tg	24 h RT + 15 h 60 °C	IO-10-69 (ASTM D 3418)	-60 ÷ -50	°C
Water absorption (24 h RT)		IO-10-70 (ASTM D 570)	0,15 ÷ 0,25	%
Water absorption (2 h 100 °C)		IO-10-70 (ASTM D 570)	0,50 ÷ 0,60	%
Linear thermal exp. (Tg -10 °C)		IO-10-71 (ASTM E 831)	na	ppm/°C
Linear thermal exp. (Tg +10 °C)		IO-10-71 (ASTM E 831)	100 ÷ 130	ppm/°C
Flammability		IO-10-68 (V-0)	4,0	mm
Thermal conductivity	25 °C	IO-10-87 (ASTM C 518)	1,20 ÷ 1,30	W/(m·K)
Thermal shock (n° 10 cycles passed)		IO-10-67 (Olyphant washer)	-30 ÷ +160	°C
Max recommended operating temperature		IEC 60085 (***)	130	°C

Typical mechanical properties in cured condition

Properties	Conditions	Test Method	Value	M/U
Specimens curing cycle		--	24 h RT + 15 h 60 °C	
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/m²
Tensile strength	25 °C	IO-10-63 (ASTM D 638)	2,2 ÷ 2,6	MN/m²
Nominal strain at break	25 °C	IO-10-63 (ASTM D 638)	14 ÷ 20	%
Compressive strength	25 °C	IO-10-72 (ASTM D 695)	na	MN/m²

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	>600	CTI
Dielectric constant	25 °C	IO-10-59 (ASTM D 150)	6,5 ÷ 7,5	
Loss factor	25 °C	IO-10-59 (ASTM D 150)	25 ÷ 35	$x10^{-3}$
Volume resistivity	25 °C	IO-10-60 (ASTM D 257)	1×10^{12} ÷ 1×10^{13}	Ω·cm
Dielectric strength	25 °C - 2 mm	IO-10-61 (ASTM D 149)	21 ÷ 23	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.