

Technical Data Sheet

Electronic Coating Materials

CONATHANE® EN-7

Two-Component Polyurethane Potting Compound & Encapsulant

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CONATHANE® EN-7

Product Description

CONATHANE® EN-7 is an unfilled, two-component, room temperature curing, 100%-solids polyurethane system.

It consists of CONATHANE® EN-4 Part A Urethane Prepolymer and CONATHANE® EN-7 Curative.

Areas of Application

Highly recommended for cable and connector potting and molding, both military and commercial, watertight electrical connectors, harness breakouts and cables.

Other applications include potting and encapsulation of modules, wire wound devices, and strain sensitive components as well as 100% solids and solvent-based coatings for printed circuitry and components.

Features and Benefits

- Superior hydrolytic stability
- Good handling properties
- Thermal shock resistant
- Non-MbOCA curing system
- High dielectric strength
- Low dielectric constant
- Low dissipation factor
- Non-nutrient for fungus

Application Methods

- Hand-mix Bench Potting / Casting
- Meter-mix Bench Potting / Casting
- Meter-mix Vacuum Potting / Casting

Transportation / Storage

Store at or below 25°C / 77°F in a dry controlled environment out of direct sunlight. This material should be suitable for use stored under these conditions in the original sealed containers for twelve (12) months from the date of shipment.

Failure to store the product as recommended above may lead to deterioration in product performance.

This product is sensitive to moisture and atmospheric humidity. Containers, once opened, should be used immediately or blanketed with dry air or nitrogen before resealing.

Mix individual components thoroughly before use.

CONATHANE® EN-4 Part A may crystallize upon storage or during shipment. If this has occurred, heat to 60°C, mix thoroughly, and cool to room temperature before processing.

Health / Safety

Refer to the Safety Data Sheet.

Typical Properties of Material as Supplied

Property	Conditions	Value		Units
		CONATHANE® EN-4 Part A Urethane Prepolymer	CONATHANE® EN-7 Part B Curative	
Viscosity	25°C / 77°F	9,000	1,000	cP
Specific Gravity	25°C / 77°F	0.97	1.00	
Appearance		Translucent Amber	Amber	
Mix Ratio	Parts by weight Parts by volume	100 100	17.5 17	
Flash Point	ASTM D93	>94 >201	>94 >201	°C °F

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Typical Properties of Mixed Materials

Property	Conditions	Value	Units
Viscosity (initial)	25°C / 77°F	5,500	cP
Gel time	25°C / 77°F	30	minutes
Peak exotherm	2 lb. mass at 25°C / 77°F	55 / 130	°C / °F

Application / Curing Schedule

Mix the EN-4 Part A and EN-7 Part B in the ratio specified above until homogeneous. Components may be preheated up to 60°C if reduced viscosity is required. If hand mixing, degas at >27 in. Hg vacuum before use.

Cure 10 - 14 days at 25°C / 77°F – **or** – 16 hours at 60°C / 140°F – **or** – 8 - 10 hours at 80°C / 176°F – **or** – 4 - 6 hours at 100°C / 212°F

Demold after 8 hours at 25°C / 77°F – **or** – 3 hours at 60°C / 140°F

The cure schedules above are based on time after the unit reaches the specified temperature and are recommendations only. The user is responsible for determining the optimum cure conditions for their application.

Typical Electrical Properties

Property	Test Method	Conditions	Value	Units
Dielectric Strength	ASTM D149	1/16" @ 25°C / 77°F	780	volts / mil
Dielectric Constant	ASTM D150	100 Hz @ 25°C / 77°F	3.0	
		1 kHz @ 25°C / 77°F	2.9	
		1 MHz @ 25°C / 77°F	2.8	
		100 Hz @ 130°C / 266°F	3.8	
		1 kHz @ 130°C / 266°F	3.8	
		1 MHz @ 130°C / 266°F	3.3	
Dissipation Factor	ASTM D150	100 Hz @ 25°C / 77°F	0.03	
		1 kHz @ 25°C / 77°F	0.03	
		1 MHz @ 25°C / 77°F	0.03	
		100 Hz @ 130°C / 266°F	0.03	
		1 kHz @ 130°C / 266°F	0.03	
		1 MHz @ 130°C / 266°F	0.04	

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Typical Electrical Properties (cont.)

Property	Test Method	Conditions	Value	Units
Volume Resistivity	ASTM D257	25°C / 77°F 130°C / 266°F	$>4.3 \times 10^{15}$ 7.4×10^{11}	ohm-cm
Surface Resistivity	ASTM D257	25°C / 77°F 130°C / 266°F	$>1.0 \times 10^{15}$ 1.6×10^{12}	ohms / sq.
Insulation Resistance	MIL-M-24041C	25°C / 77°F 130°C / 266°F	$>2.5 \times 10^{13}$ 2.3×10^{10}	ohms
Arc Resistance	MIL-M-24041C	25°C / 77°F	>120	seconds

Typical Mechanical Properties

Property	Test Method	Conditions	Value	Units
Appearance	Visual	25°C / 77°F	amber	
Specific Gravity	ASTM D792	25°C / 77°F	1.01	
Shore Hardness	ASTM D2240	25°C / 77°F After 7 d @ 135°C / 275°F	A 90 A 95	
Tensile Strength	ASTM D412	25°C / 77°F 100% modulus 300% modulus	>2,000 800 1,200	psi psi psi
Ultimate Elongation	ASTM D412	25°C / 77°F	>400	%
Tear Strength	ASTM D624	25°C / 77°F	>200	pli
Linear Shrinkage	MIL-M-24041C		1.2	%
Volumetric Shrinkage	MIL-M-24041C		3.7	%
Water Absorption	ASTM D570	24 h @ 25°C / 77°F 30 d @ 25°C / 77°F	0.2 0.4	%
Heat Aging (wt. loss)	MIL-M-24041C	7 d @ 135°C / 275°F	0.4	%
Fungus Resistance	MIL-E-5272C		non-nutrient	
Thermal Shock	MIL-I-16923E	-70°C to 130°C	pass 10	cycles
Compression Set	ASTM D395	Method B	31	%
Peel Strength	Aluminum primed with CONAP® AD-1147-C Stainless steel primed with CONAP® AD-1146-C Neoprene primed with CONAP® PR-11167 PVC Primed with CONAP® AD-1161		>20 >20 >20 >20	piw piw piw piw

CONATHANE® EN-7**Typical Hydrolytic Stability Properties (97°C / 95% RH)**

Property	Test Method	Original	After 112 Days	Units
Shore Hardness	ASTM D2240	A 94	A 87	
Tensile Strength	300% modulus	2,250 1,750	775 700	psi psi
Ultimate Elongation	ASTM D412	400	370	%
Tear Strength	Die C	320	190	pli
Dielectric Strength	1/16" - 25°C / 77°F	780	570	volts / mil
Dielectric Constant	1 kHz - 25°C / 77°F	2.9	3.0	
Dissipation Factor	1 kHz - 25°C / 77°F	0.03	0.03	
Volume Resistivity	25°C / 77°F	$>4.2 \times 10^{15}$	2.8×10^{15}	ohm-cm

The above properties are typical values and are not intended for specification use.

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