

CONATHANE® EN-9 OZR — Conforms to MIL-M-24041-C —

CONATHANE EN-9 OZR is a two-component, ozone resistant, Non-MbOCA based, high-strength liquid polyurethane potting and molding system developed specifically to replace MbOCA-based systems currently approved for use under Military Specification MIL-M-24041, including our own CONATHANE® EN-1554. Elastomers prepared from EN-9 OZR exhibit the following outstanding properties:

- Superior hydrolytic stability
- Non-MbOCA curing systems
- Low dielectric constant
- Low dissipation factor
- Good handling properties
- Low viscosity
- Fungus resistance
- High dielectric strength
- Thermal shock resistance
- Ozone resistance

CONATHANE EN-9 OZR is recommended for military and commercial cable and connector potting and molding. Other applications include potting and encapsulation of modules, wire wound devices, and strain sensitive components.

TYPICAL CURED PROPERTIES

The properties presented below are typical and are not intended for specification purposes. All test specimens were cured 16 hours at 80°C (176°F) and conditioned at 25°C for 3 days prior to testing.

PHYSICAL PROPERTIES

	CONATHANE EN-9 (OZR)	TEST METHOD
Color	Translucent Amber or Black	Visual
Specific Gravity @ 25°C	1.01	ASTM D-792
Hardness, Shore A	90 ± 5	ASTM D-2240
Tensile Strength, psi	1900 min.	ASTM D-412
100% Modulus, psi	800	
300% Modulus, psi	1600	
Ultimate Elongation, %	380	ASTM D-413
Tear Strength (Die C), pli	300	ASTM D-624
Shrinkage, Linear/Volume, %	1.00/2.0	CONAP/MIL-M-24041-C
Moisture Absorption (24 hours @ 200°F), %	0.57	MIL-M-24041-C
Water Absorption @ 25°C, 24 hours, %	0.20	ASTM D-570
Ozone Resistance, 50 pphm	>9 weeks	ASTM D-518 Proc. B D-1149
Fungus Resistance	Non-Nutrient	MIL-E-5272C
Thermal Shock, 10 cycles, Olyphant washer 130°C to -70°C	Passes	MIL-I-16923E
Compression Set,(Method B), %	50	ASTM D-395
Peel Strength, piw		MIL-M-24041
CRES primed w/AD-1146-C	95	
Monel primed w/AD-1146-C	114	
Neoprene primed w/PR-1167	20	
PVC primed w/AD-1161	50	

The dielectric properties of CONATHANE EN-9 OZR are excellent. The dielectric constant and dissipation factor are exceptionally low and remain relatively unchanged over the recommended operating temperature range of -70°C to 130°C.

CONATHANE EN-9 OZR cures to a nominal Shore A Hardness of 85 and has an application life of about 1-hour. It is available in translucent amber or black in pre-weighed, two-component units.

TYPICAL PRODUCT CHARACTERISTICS

	Prepolymer PART A	Resin PART B
Color	Translucent Amber	Amber or Black
Viscosity @ 25°C, cps	10,500	850
Specific Gravity @ 25°C	0.97	1.00
NCO Content, %	9.0 ± 0.2	---
Shelf Life (from date of manufacture when unopened and in the original containers)	15 months	15 months
Non-volatile Content (Mixed), %	>99	

ELECTRICAL PROPERTIES	25°C	105°C	130°C	TEST METHOD
Dielectric Constant, 100 Hz	3.03	4.03	3.78	ASTM D-150
1 KHz	2.95	3.89	3.78	
1 MHz	2.81	3.06	3.14	
Dissipation Factor, 100 Hz	0.031	0.028	0.017	ASTM D-150
1 KHz	0.034	0.025	0.032	
1 MHz	0.010	0.047	0.064	
Volume Resistivity, ohm-cm	3.42 x 10 ¹⁵	3.22 x 10 ¹¹	3.15 x 10 ¹¹	ASTM D-257
Surface Resistivity, ohms	>1.02 x 10 ¹⁵	1.47 x 10 ¹²	1.02x 10 ¹³	ASTM D-257
Insulation Resistance, ohms	>2.5 x 10 ¹³	1.68 x 10 ¹⁰	1.68 x 10 ¹⁰	MIL-M-24041
Dielectric Strength, vpm (1/16")	610	---	---	ASTM D-149
Arc Resistance, seconds	>120	---	---	MIL-M-24041
Flame Resistance, 55 amps D.C.	No Ignition	---	---	MIL-M-24041

HYDROLYTIC STABILITY

Elastomers prepared from CONATHANE EN-9 OZR offer unsurpassed hydrolytic stability. The following table presents the properties of these elastomers after continuous exposure to 97°C - 95% R.H. for the periods indicated. Specimens were tested within 24 hours after removal from chamber.

PROPERTY	Initial	28 Days	56 Days	120 Days
Hardness, Shore A	90	90	87	84
Tensile, psi	2275	1920	1800	1025
100% Modulus, psi	1560	1500	1400	700
300% Modulus, psi	2150	1875	1740	975
Elongation, %	400	385	380	350
Tear, pli	289	295	290	210

HEAT AGING AT 100°C	Initial	7 Days	14 Days	28 Days
Hardness Shore A	92/85	94/88	92/87	93/89
Tensile, psi	1900	1800	1350	1200
100% Modulus, psi	825	1100	900	900
300% Modulus, psi	1300	1800	--	--
Elongation, %	410	356	253	186
Tear, pli	256.3	266.2	245	245

RECOMMENDED PROCESSING PARAMETERS

Mix Ratio by Weight – Part A/Part B	100/17.5
Exotherm (2 lb. mass), mixed @ 25°C	55°C

	Initial	10 minutes	20 minutes	30 minutes	40 minutes	50 minutes	60 minutes
Mixed Viscosity @ 25°C, cps	8000	8800	12,400	26,800	70,000	208,000	250,000

	60°C	80°C	100°C
Demold time, hours	5	4	2
Cure Time, hours	24	16	8

NOTE: The Part A component of EN-9 OZR may crystallize upon storage or during shipment. If this has occurred, heat to 60°C, mix thoroughly and cool to room temperature before processing.

Mix the two components together thoroughly at 25°C-60°C using metal, plastic, or glass stirrers and containers. Degas the mixed material at 1-5mm of mercury and pour into molds at 25°C-100°C. Containers should be large enough to allow for volume expansion during the degassing cycle. Any material or

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container that could introduce moisture into the system should be avoided.

SPECIAL NOTICE:

Due to the excellent solubility of this liquid system in solvents such as Methyl Ethyl Ketone, Xylene, Toluene and various blends of these, this system shows promise as a flexible conformal coating for printed circuitry and components. Initial laboratory evaluations have shown excellent dipping and spraying qualities when diluted 40%-60% with a blend of MEK/Toluene.

HANDLING AND STORAGE

The component parts of CONATHANE EN-9 OZR have a shelf life of 15 months from date of manufacture in the original unopened containers when stored at 70°F-85°F. If containers are opened and the contents only partially used, containers should be flushed with dry nitrogen (see CONAP® Dri-Purge) before resealing to prevent waste of material.

CAUTION: Avoid contact with resin and hardener. The use of protective clothing is recommended. Should contact occur, wash with mild soap and water. Use only in well ventilated areas and avoid prolonged or repeated breathing of fumes. Curing ovens should be vented to the atmosphere.

COLORING

CONATHANE EN-9 OZR cures to a translucent amber or black solid. Please specify color when ordering. CONAP® color concentrates can be added to make color variations. (see CONAP® DS-1830 *Technical Bulletin AC-112*.)

AVAILABILITY

CONATHANE EN-9 OZR is available in two-component, pre-weighed gallon, 5-gallon, and 55-gallon units.

An Evaluation Kit of CONATHANE EN-9 OZR is available for a nominal fee.

CAUTION

Responsible handling of Cytec products requires a thorough preview of safety, health, and environmental issues prior to use. Review the Material Safety Data Sheets(s) for the specific Cytec product(s) and container label information before opening containers. Ensure that employee exposure issues are understood, communicated to all workers, and controls are in place to prevent exposures above Permissible Exposure Limits (P.E.L.'s). Review safety and environmental issues to be certain controls are in place to prevent injury to employees, the community, or the environment, and ensure compliance with all applicable Federal, State, and Local laws and regulations. For assistance in this review process, please call your Cytec representative or our office noted below.