

CONATHANE® EN-13

CONATHANE EN-13 is a non-mercury version of CONATHANE® EN-2. EN-13 is an unfilled, two-part, room temperature curing, tough, highly flexible polyurethane resin system. The system is easily processed at room temperature and cures without bubbles or pin-holes. Surfaces of castings prepared under normal ambient conditions are tack-free. Cured castings have excellent water resistance, good high and low temperature properties, and exceptional electrical properties.

The initial low viscosity of the system allows good penetration into fine windings. CONATHANE EN-13 is fully transparent and can easily be cut into to remove defective components. Repairs can be made by application of more of the liquid system.

CONATHANE EN-13 is particularly recommended for potting and encapsulating strain and heat sensitive devices in modules, connectors, and units required to operate in the temperature range of -65°C to 130°C. It also has casting utility as a conformal coating and can be applied by casting, spraying, or brushing. Airless spray equipment can be used effectively.

TYPICAL PRODUCT CHARACTERISTICS

	Prepolymer PART A	Resin PART B
Appearance	Amber Liquid	Amber Liquid
Brookfield Viscosity @ 25°C, cps	1700	900
Specific Gravity @ 25°C	1.10	0.97
Color	Amber	Amber
Isocyanate Content, %	15.50	----

TYPICAL PROPERTIES OF ROOM TEMPERATURE CURED CONATHANE EN-13

PHYSICAL PROPERTIES

Color	Transparent Light Amber
Specific Gravity	1.04
Hardness, Shore A	65
Tensile Strength, psi	600
Elongation, %	110
Tear Strength, pli	37
Thermal Shock, 10 cycles, 130°C to -65°C	No Cracking

PHYSICAL PROPERTIES (CONTINUED)

Linear Shrinkage, %	0.31
Heat Stability, % weight-loss after:	
7 days @ 130°C	0.93
7 days @ 155°C	2.17
Thermal Conductivity, cal/sec/cm ² /°C/cm	3.50 x 10 ⁻⁴
Water Absorption, %, 24 hour Immersion	0.40
7 day Immersion	0.79
10 week Immersion	0.80

ELECTRICAL PROPERTIES

	25°C	60°C	90°C	120°C
Dielectric Strength - 1/16" Sample, vpm	645	---	---	---
Arc Resistance, Seconds	>120	---	---	---
Dielectric Constant, @ 100 Hz	5.71	6.56	6.02	5.46
@ 1 KHz	4.69	6.25	5.91	5.13
@ 10 KHz	4.01	5.50	5.79	5.11
@ 100 KHz	3.65	4.56	5.38	5.02
@ 1 MHz	3.42	3.83	4.48	4.59
Dissipation Factor, @ 100 Hz	0.123	0.045	0.077	0.191
@ 1 KHz	0.121	0.072	0.031	0.042
@ 10 KHz	0.082	0.115	0.044	0.022
@ 100 KHz	0.052	0.115	0.086	0.039
@ 1 MHz	0.038	0.074	0.112	0.082
Volume Resistivity, ohm-cm	3.1 x 10 ¹³	1.0 x 10 ¹²	1.5 x 10 ¹¹	3.0 x 10 ¹⁰
Surface Resistivity, ohms	1.2 x 10 ¹³	3.8 x 10 ¹¹	5.6 x 10 ¹⁰	1.3 x 10 ¹⁰
Insulation Resistance, ohms	3.9 x 10 ¹²	6.8 x 10 ¹⁰	1.0 x 10 ¹⁰	2.3 x 10 ⁹
After 10 Week Immersion in Distilled Water	3.2 x 10 ¹¹	---	---	---

RECOMMENDED PROCESSING PARAMETERS

Mix Ratio by Weight, Resin/Hardener	100/90
Mix Ratio by Volume, Resin/Hardener	1/1
Initial Mixed Viscosity @ 25°C, cps	1200
Working Life @ 25°C, 1 lb. mass	30 minutes
Peak Exotherm, Mixed @ 25°C, 2 lb. mass	75°C
Peak Exotherm, Mixed @ 25°C, 1 lb. mass	77°C

Cure: One of the following cure schedules is recommended to obtain optimum properties:

TEMPERATURE	DEMOLDING TIME	COMPLETE CURE
25°C	6-8 hours	3-5 days
60°C	1 hour	3 hours*

* An alternate schedule of 1 hour @ 60°C plus 2-3 days at 25°C may also be used.

NOTE: Higher cure temperatures can be used; e.g., 100°C, but the resin system must be completely degassed in order to obtain void-free castings. Demolding time at 100°C is 10-15 minutes.

The two components should be mixed thoroughly in metal or glass containers using metal or glass stirrers. Degassing of the mixed system should be accomplished at room temperature at 1-5mm Hg vacuum. Containers should be large enough to allow for frothing during degassing. To ensure void-free castings, any material or container that could introduce moisture into the system should be avoided. Do not heat the components of the system prior to mixing.

The mixed viscosity is only 1200 centipoise (cps) at 25°C. After this induction period, reaction proceeds rapidly but with little exotherm, and gelation occurs in 30-35 minutes.

HANDLING AND STORAGE

CONATHANE EN-13 has a shelf life of 18 months from date of manufacture when stored in the original unopened containers at temperatures of 65°F to 85°F. If containers are opened and

the contents only partially used, containers should be flushed with dry nitrogen (see CONAP® Dri-Purge) or dry air before being resealed to prevent waste of material.

CAUTION:

FOR INDUSTRIAL USE ONLY ! DO NOT TAKE INTERNALLY.

The Part A component is a toluene diisocyanate (TDI) based prepolymer. Use only in well-ventilated areas. Avoid breathing of vapors and protect skin and eyes from contact.

Should skin contact occur with either component, wash immediately with soap and water. For eye contact, immediately flush with plenty of water and obtain medical attention.

Request material safety data sheets for complete details.

COLORING

CONATHANE EN-13, as supplied, cures to a transparent light amber solid. As a convenience to customers who may wish to pigment these systems, Cytec supplies color concentrates in paste form in four standard colors - Red, Black, Blue, and White (see CONAP® DS-1830).

CONAP® Color Concentrates are available in quart, gallon, and 5-gallon containers. Pigments must be added to Part B of the system.

AVAILABILITY

CONATHANE EN-13 is available in quart, gallon, 5-gallon, and drum units. Each unit consists of pre-weighed quantities of Part A and Part B packaged in separate containers.

An EVALUATION KIT of CONATHANE EN-13 is available at 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.

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