



TECHNICAL DATA SHEET

FORMULATED RESINS

CONATHANE[®] EN-21



DESCRIPTION

CONATHANE EN-21 is a two-component, liquid, low viscosity, low toxicity, room temperature curing polyurethane resin system. This system was formulated specifically for the potting, casting, embedding, and encapsulation of electronic circuits, components, and power devices. It is UL 94 HB certified.

CONATHANE EN-21 is an easy-to-use, non-TDI, non-MbOCA system. It can be hand mixed or machine dispensed and cured at room or elevated temperatures. CONATHANE EN-21 cures to yield an 80 Shore A elastomer and has the following outstanding characteristics:

- Excellent Electrical Properties
- Low Viscosity
- Easy Handling
- Reversion Resistance
- Low Toxicity
- Low Exotherm and Low Shrinkage
- Low Stress Build-up on Embedded Components
- Excellent Moisture Resistance

CONATHANE EN-21 is ideal for use in potting transformers, coils, reed and mercury switches, inductors, solid state ignition systems, voltage regulators, ballasts, micro-circuits, rectifiers and printed circuit assemblies.

CHARACTERISTICS AND PROPERTIES

Table 1 | Product Description

Property	Prepolymer Part A	Curative Part B
Viscosity @ 25°C	6,000 cps	800 cps
Specific Gravity @ 25°C	1.14	0.96
Color	Clear Amber	Clear Amber
NCO Content	16.0	---

Table 2 | Processing Parameters

Property	Value
Mix Ratio by Weight, Prepolymer/Curative	100 / 116
Mixed Viscosity @ 25°C, cps	2000
Mixed Viscosity @ 60°C, cps	320
Pot Life @ 25°C, 250 grams, minutes	40
Pot Life @ 60°C, minutes	8
Gel Time @ 25°C, 250 grams, minutes	90
Gel Time @ 60°C, minutes	20
Peak Exotherm, Mixed @ 25°C	69°C
Recommended Cure	7 Days @ 25°C OR 4 hours @ 80°C

The following procedure is suggested for hand processing:

1. Mix the two components together thoroughly at room temperature in metal, plastic, or glass containers, using a metal spatula. DO NOT use paper containers or wooden sticks. Any moisture introduced into the system will cause bubbling and/or foaming during curing.
2. If void-free castings are required for the particular application, degas the mixed system at 1-5 mm of mercury vacuum. Allow froth to rise and collapse; continue vacuum for 2-5 minutes. Containers should generally have twice the volume of mixed material to allow for frothing.
3. Pour into dry preheated units. Best results are generally obtained when the unit is at least 10°C warmer than the mixed material. Pour down the side of the unit to be potted to avoid air entrapment.
4. If the potted device is to be heat cured, it is best to allow the device to sit at room temperature for 1-2 hours to permit air bubbles, entrapped during pouring, to dissipate.
5. When containers are opened and the contents only partially used, be certain to flush them with dry nitrogen or CONAP® Dri-Purge to prevent moisture contamination and subsequent waste of material.

MOLD RELEASE AGENTS

If the potted device is to be removed from a mold, apply a quality CONAP® mold release to ensure proper release.

PRIMERS

If improved adhesion is required, use one of the following recommended primers:

1. To Metals - Heat Curing — CONAP® AD-1146-C
2. To Plastics and Rubber — CONAP® PR-1167

Table 3 | Cured Properties

Property	Value
Hardness, Shore A (±5)	80
Tensile Strength, psi	2,000
Elongation, %	155
Tear Strength, pli	119
Linear Shrinkage, in./in.	0.014
Water Absorption @ 25°, %	
24 hours	0.07
1 Week	0.15
4 Weeks	0.16
Compression Set (Method B), %	10
Specific Gravity @ 25°C	1.07
Linear Thermal Expansion, in./in., °C	2.10 x 10 ⁻⁴
Hydrolytic Stability	Passes
Thermal Conductivity (cal/sec/cm2/°C/cm)	7.1 x 10 ⁻⁴
Thermal Shock	Passed Olyphant Washer Test per MIL-I-16923E (-65°C to +130°C)
Heat Stability @ 130°C	
500 hours:	
Shore Hardness	91A
% Weight Loss	0.34
1,000 Hours	
Shore Hardness	96 A
% Weight Loss	0.48
UL Flammability Rating	94HB

Table 4 | Electrical Properties

Property	Value @ 25°C	Value @ 105°C	Value @ 130°C
Dielectric Strength, vpm (1/16")		650	
Volume Resistivity, ohm-cm	7.2×10^{14}		1.8×10^{11}
Surface Resistivity, ohms	$>1.0 \times 10^{15}$		6.9×10^{12}
Dielectric Constant @ 1 KHz	3.4	6.1	
Dissipation Factor @ 1 KHz	0.017	0.030	
Insulation Resistance, ohms	$>2.5 \times 10^{13}$		1.4×10^9

AVAILABILITY

CONATHANE EN-21 is available in quart, gallon, 5-gallon, and 55-gallon units. Each unit consists of pre-weighed quantities of Part A and Part B components.

HANDLING AND STORAGE INSTRUCTIONS

Although the very low vapor pressure of CONATHANE EN-21 greatly reduces the vapor hazard as compared to TDI-based systems, careless handling of any isocyanate should be avoided. The user is cautioned to avoid contact with the resin and hardener. The use of protective clothing is recommended. Should contact occur, the skin should be washed immediately with mild soap and water. In case of eye contact, flush eyes immediately with water and obtain medical attention.

Use in well-ventilated areas and avoid prolonged or repeated breathing of vapors. Accidental spills in the work area should be wiped up right away. (For additional information, request Bulletin GI-4).

CONATHANE EN-21 Part A and Part B components are storage stable in their original, unopened containers for 18 months from date of manufacture when stored at 20°C-30°C.

CAUTION

Responsible handling of Cytec Industries Inc. 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 Industries Inc. 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 (PELS). 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 Industries Inc. representative or our office noted below.

PRODUCT HANDLING AND SAFETY

Cytec Industries Inc. recommends wearing clean, impervious gloves when working with potting compound to reduce skin contact and to avoid contamination of the product. Materials Safety Data Sheets (MSDS) and product labels are available upon request and can be obtained from www.cytec.com or by contacting Global Product Referral (see information below).

DISPOSAL OF SCRAP MATERIAL

Disposal of scrap material must be in accordance with local, state, and federal regulations.

CONTACT INFORMATION

Global Product Referral

tel: 1 800 652 6013 – USA

tel: +1 973 357 3193 – Outside the USA

email: custinfo@cytec.com

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