CYTEC

TECHNICAL DATA SHEET Formulated Resins

CONATHANE® EN-2550

DESCRIPTION

CONATHANE EN-2550 is a two-part, filled polyurethane resin system formulated for casting high-voltage transformers and potting or encapsulating electronic devices. The system features good handling properties at room temperature, good working life, and minimum processing hazards.

CONATHANE EN-2550 can be cured at room or elevated temperatures without the formation of voids. The cured compound has excellent water resistance, and is resistant to thermal shock. Other beneficial characteristics of this system include low exotherm, low stresses during cure, low shrinkage, and very good electrical properties.

CHARACTERISTICS AND PROPERTIES

Table 1 | Product Description

Property	Prepolymer Part A	Curative Part B
Viscosity @ 25°C	150 cps	17,000 cps
Specific Gravity @ 25°C	1.23	1.52
Color	Dark Brown	Black, Blue, or Tan
Solids Content, %	100	100
Agitate Part B to re-dispense settled filler prior to use.		

Table 2 | Cured Properties

Property	Value
Color	Black, Blue, or Tan
Hardness, Shore D	65
Tensile Strength, psi	1850
Elongation, %	32
Tear Strength, pli	235
Thermal Shock, 10 cycles, -65°C to 130°C	Passes
Linear Shrinkage, %	0.58
Linear Thermal Expansion, in./in./°C	16.3×10^{-5}
Thermal Conductivity, cal/sec/cm²/°C/cm	8.0×10^{-4}
Water Absorption, % weight gain 24 Hour Immersion @ 25°C 7 Day Immersion @ 25°C 7 Days in Boiling Water, Hardness % weight gain	 0.0747 0.1877 53D 1.54
Fungus Resistance	Non-nutrient (MIL-E-5272C and MIL-STD-810B)
Flammability	UL 94V-0

Heat Aging	500 hours @ 125° C	1000 hours @ 125°C
Shore D Hardness	75/73	80
Tensile, psi	2710	3363
Tear, pli	300	315
Elongation, %	16	5

Thermal Humidity Aging	500 Hours @ 85°C/85% R.H.	1000 Hours @ 85°C/85% R.H.
Shore D Hardness	55/50	45
Tensile, psi	800	765
Tear, pli	123	124
Elongation, %	88	100

Chemical Resistance

Castings made from CONATHANE EN-2550 have excellent resistance to salt water, mild acids and bases, and to all aliphatic hydrocarbons. They are not resistant to chlorinated hydrocarbons, aromatic solvents, or oxygenated solvents. Specific information will be furnished on request.

Table 3 | Electrical Properties

Property	Value		
Dielectric Strength, vpm - 0.062" Thickness - 0.032" Thickness - 0.016" Thickness	532 840 1090		
Arc Resistance, seconds	>120		
Inclined Plane - ASTM D-2303	+600 minutes		
	25°C	60°C	120°C
Dielectric Constant, 100 Hz 1 KHz 1 MHz	4.38 4.13 3.81	6.59 5.82 4.00	6.00 5.73 4.81
Dissipation Factor, 100 Hz 1 KHz 1 MHz	0.096 0.034 0.020	0.080 0.107 0.047	0.143 0.035 0.100
Insulation Resistance, ohms Volume Resistivity, ohm-cm Surface Resistivity, ohms	3.0×10^{13} 2.1×10^{14} 6.1×10^{17}	1.1×10^{11} 1.1×10^{13} 1.5×10^{14}	1.2×10^{10} 1.4×10^{11} 7.8×10^{11}

Table 4 | Recommended Processing Procedure

Property	Value
Mix Ratio by Weight, Resin/Hardener (A/B)	17/100
Mix Ratio by Volume, Resin/Hardener (A/B)	21/100
Initial Mixed Viscosity @ 25°C	3000 cps
@ 40°C	1200 cps
Work Life, 234 gm mass @ 25°C to 100,000 cps	53 minutes

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

Temperature	Demolding Time	Cure Time
25°C	12-16 hours	7-10 days
60°C	1-2 hours	16 hours
100°C	30 minutes	4 hours

The two components should be mixed thoroughly in metal or glass containers using metal or glass stirrers. Degassing of the mixed material should be accomplished at room temperature to 60°C at 1 to 5 mm Hg vacuum. Containers should be large enough to allow for frothing during degassing. Any material or container that could introduce water into the system should be avoided.

Metal molds should be coated with a mold release agent such as CONAP® MR-5002.

AVAILABILITY

Standard units of CONATHANE EN-2550 are available in quart, gallon, 5-gallon, and drum containers. Each unit consists of pre-weighed quantities of Part A and Part B packaged in individual containers.

See the **Comparison Chart for CONATHANE® EN-2500 Series** to compare properties of similar products.

HANDLING AND STORAGE

CONATHANE EN-2550 Part A and Part B should be stored at temperatures of 65°F-85°F in tightly closed containers. If containers are opened and the contents only partially used, the container should be flushed with dry nitrogen (see CONAP® Dri-Purge) or dry air before being resealed. If crystallization has occurred, heat the components(s) to 140°F(60°C) and mix well to re-liquefy. Stabilize component(s) to room ambient temperature (or selected pre-heat temperature) prior to use.

The shelf life of CONATHANE EN-2550 Part A and Part B is 18 months from date of manufacture when stored in the original unopened containers.

CAUTION

This product contains an isocyanate-based prepolymer. Gross or repeated exposure can sensitize skin and respiratory tract. While vapors will be significantly lower than a TDI-based prepolymer, heating will increase vapor concerns. Absorption through the skin can result in both skin and respiratory sensitization. Avoid skin contact with uncured product. Provide ventilation of process and monitor to ensure control below permissible exposure limits (see MSDS for more detail), or provide NIOSH-approved respiratory protection.

Note: The fillers in CONATHANE EN-2550 Part B have a tendency to settle to the bottom of the container. Generally this is a soft settlement which can be brought back into suspension by agitation or by rolling on a roller. To ensure the mix ratios are correct, it is important that the fillers be brought back into suspension.

The low vapor pressure of the CONATHANE EN-2550 system greatly reduces the vapor hazard and toxicity as compared to TDI (toluene diisocyanate) and TDI prepolymers.

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 (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 Industries Inc. representative or our office noted below.

DISCLAIMER: The data and information provided in this document have been obtained from carefully controlled samples and are considered to be representative of the product described. Because the properties of this product can be significantly affected by the fabrication and testing techniques employed and since Cytec Industries (Cytec) does not control the conditions under which its products are tested and used, Cytec cannot guarantee that the properties provided will be obtained with other processes and equipment. Cytec has the right to change any data or information when deemed appropriate.

• Email: custinfo@cytec.com Worldwide Contact Info: www.cytec.com/conap Tel: (+1) 716-372-9650 Fax: (+1) 716-372-1594