

# NVER™990

Novolac Epoxy Based Vinyl Ester Resin



Building  
&  
Transportation



Oil, Gas  
&  
Industrial



Offshore  
&  
Onshore



Water  
&  
Wastewater

## PRODUCT DESCRIPTION

The CTech-LLC® epoxy vinyl ester resin (**NVER™990**) is a novolac-epoxy base resin, designed to provide chemical resistance in combination with temperature performance. It offers a high resistance to strong acids, oxidizing environments and organic solvents at elevated temperatures.

### PHYSICAL PROPERTIES

|                                              |                                                        |
|----------------------------------------------|--------------------------------------------------------|
| Chemical Base                                | Novolac Epoxy Based Vinyl Ester Resin                  |
| Color                                        | Clear amber liquid                                     |
| Specific Gravity<br>(ISO 2811)               | 1.06 +/- 0.02                                          |
| Viscosity<br>(ISO 2555)                      | 450 +/- 50 cps                                         |
| Solid Content<br>(ISO 3251)                  | 65 +/- 2 %                                             |
| Exothermic Peak Temperature<br>(ASTM D 2471) | 160-170 °C                                             |
| Gel Time<br>(ASTM D 2471)                    | 20 – 25 minute                                         |
| Application Methods                          | Filament Winding                                       |
|                                              | Hand Lay-Up                                            |
|                                              | Spray-Up                                               |
|                                              | Pultrusion Process                                     |
| Shelf Time                                   | 6 months 25°C                                          |
| Storage Condition                            | Store dry and away from direct sunlight<br>below 25° C |

## ADVANTAGES

- Epoxy novolac vinyl ester resin.
- NVER™990 resin provides resistance to acids and has superior resistance to many organic solvents.
- NVER™990 resin has high thermal resistance and good mechanical properties.
- FRP equipment produced using NVER™990 Epoxy novolac vinyl ester resin retains strength and toughness at elevated temperatures.
- NVER™990 Epoxy novolac vinyl ester resin is successfully used in heavy duty industrial applications over many years



## TYPICAL USES

The NVER™990 resin is suitable for use in hand lay-up, spray-up, and filament winding processes where a high resistance to solvents and chemicals and good retention of strength and toughness at elevated temperatures are required.

## STORAGE & SHELF LIFE

- NVER™990 must be stored at stable temperature below 25°C (77°F). Avoid freezing the product and keep it away from direct sunlight, flame or other hazards.
- NVER™990 must be stored in its original packaging. Lid of the container should be kept closed. Moisture can decrease shelf life of resins. With proper storage, resin and hardeners remain usable for 6 months 25°C.

### Typical Casted Resin Properties

|                                                                  |               |
|------------------------------------------------------------------|---------------|
| Tensile Strength<br>(ASTM D638)                                  | Min 85 MPa    |
| Tensile Modulus<br>(ASTM D638)                                   | Min 3.5       |
| Tensile Elongation<br>(ASTM D638)                                | Min 4 %       |
| Flexural Strength<br>(ASTM D 790)                                | Min 125 MPa   |
| Flexural Modulus<br>(ASTM D 790)                                 | Min 3 GPa     |
| Heat Deflection Temperature<br>(HDT)<br>(ISO 75-2 Test Method A) | Min 135 °C    |
| Glass Transition Temperature<br>(Tg) (ASTM E 1640)               | Min 140 °C    |
| Barcol Hardness                                                  | Min 45 Barcol |

**Gel Time Behavior of Resin**

|                                                                                                                      |       |       |       |
|----------------------------------------------------------------------------------------------------------------------|-------|-------|-------|
| Temperature (°C)                                                                                                     | 18    | 25    | 30    |
| Gel Time (minute)                                                                                                    | 28-33 | 20-25 | 12-16 |
| Mix ratio for measuring Gel Time: 1.0 phr Cobalt Octoate (1.0%), 0.7 phr DMA (10%) - Catalyst: 1.3 phr Akperox (A60) |       |       |       |

**CAUTION**

All components of resin systems may cause skin irritation and sensitization. Use of chemical resistant gloves is recommended.

Avoid breathing vapors and dust. Get medical attention if you are breathing with difficulty.

Resin products can cause strong eye irritation. Avoiding eye contact and using safety goggles is necessary.

**CTech-LLC®**

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**IMPORTANT NOTE:**

Before using any CTech-LLC® product, the user must review the most recent version of the product's technical data sheet, material safety data sheet and other applicable documents, available at [www.ctech-llc.com](http://www.ctech-llc.com).

**WARANTY:**

CTech-LLC® warrants its products to be free from manufacturing defects. Buyer determines suitability of product for use and assumes all risks. Buyer's sole remedy shall be limited to replacement of product. Any claim for breach of this warranty must be brought within one month of the 'date of purchase. CTech-LLC® shall not be liable for any consequential or special damages of any kind, resulting from any claim or breach of warranty, breach of contract, negligence or any legal theory. The Buyer, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before utilizing.