



## VRE-5612

### DESCRIPTION:

Novolac epoxy vinyl ester resin of brown color, medium viscosity and reactivity. Unpromoted formulation allows for customization for specific processes. Less foaming than conventional vinyl ester resins.

### USES:

Recommended for fabricating methods such as filament winding, pultrusion, RTM, hand-lay up or spray-up laminates. Is designed to make industrial parts with excellent chemical and heat resistance, including storage tanks, pipes, containers and floors.

### TYPICAL LIQUID PROPERTIES:

Next values are for a reference guide only. Certain batches will not conform exactly to these numbers due to: storage conditions, temperature changes, batch age, test equipment and procedures; these

variables may affect deeply the evaluation results. Products with values outside of these numbers can perform acceptably. Final suitability of product is in the end use performance.

Test	Minimum Value	Maximum Value	Test Method
Non-Volatile Content (%)	68	72	CCP-300.8
Brookfield Viscosity (cps) <sup>2</sup>	250	450	CCP-400
Acid Number (solution)	--	13	CCP-100
Gel Time (minutes) <sup>1</sup>	15	25	CCP-503.7
Gel to Peak (minutes) <sup>1</sup>	10	20	CCP-503.7
Exothermic Peak (°C) <sup>1</sup>	160	190	CCP-503.7
Appearance	Clear	Clear	Visual
Stability @ 120°C (hours)	1	--	CCP-601

<sup>1</sup> 0.15% Co (at 12%), 0.05% DMA, 1.5% Butanox M-50 @ 25°C

<sup>2</sup> LVF, spindle # 3, 60 rpm @ 25°C

### CURE:

It is recommended that gel time be tested in the customer's plant, due to age, temperature, humidity and catalyst type / amount, will produce varied gel times.

The catalyst level should not exceed 2.4% or fall below 1% for proper cure.

This product will have use difficulty when temperature fall below 16°C, due to curing may be adversely affected. All the gel and cure times are related to Butanox M-50 as catalyst. If any doubt, please contact our Technical Service Department.

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### PHYSICAL PROPERTIES:

Polyester resin do not develop ultimate physicals, i.e. "cure" right away. Time and / or heat are needed. Heat may come from internal exotherm or external sources. The amount of catalyst will affect the cure. With time and / or heat, a "moderate cure" will develop into "ultimate physicals".

When the part reaches ultimate cure depends upon time, temperature and satisfactory catalyzation. Too

much or too little catalyst can result in permanent under-cure, wich cannot be overcome.

Practically speaking, serviceable cure time will range from overnight to a week, and occasionally longer due to circumstances. Small and thickness laminates, properly catalyzed without exotherm or external heat can be delay months or years to get their last physical properties. Sufficient external heat can reduce the cure time to less than one day.

Test (cast resin) <sup>1</sup>	Value
Tensile Strength (MPa)	83
Tensile Modulus (MPa)	4,690
Elongation (%)	3.0
Flexural Strength (MPa)	134
Flexural Modulus (MPa)	3,400
HDT (°C)	150
Barcol Hardness (934-1)	45

<sup>1</sup> Post-cure condition: 2 hrs @ 80°C + 1 hr @ 120°C (Additional 1 hr @ 150°C only for HDT)

### CAUTIONS:

Do not use air to mix, because it is not effective and moreover can produce contamination with water and oil. Do not add any material than the recommended fillers and catalyst for this product. If any doubt, please contact our Technical Service Department.

**Warning: Avoid direct mixing of organic peroxide with metallic soaps, amines or any type of accelerator or promotor, because it can result on violent decomposition with fire or explosion.**

### STORAGE LIMITATIONS:

Uncatalyzed unsaturated polyester have a usage life of six months from date of manufacture when stored at 25°C or below, in a closed, factory-sealed,

opaque container and out of direct sunlight, heat sources or moisture. By each 7°C increment on temperature, usage life decrease to half.

### SHIPPING:

Metallic, closed and sealed drums of 200 Kg or tank-wagons.

Last Revision: Aug/16/2013



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