

# VITRIMAX

100 °C VITRIMER MATRIX FOR  
SPORTS APPLICATIONS

T 100

TECHNICAL DATA SHEET

## DESCRIPTION

Mallinda's vitrimer resins enable circularly recyclable composite structures, and the option of post-cure processing provides unprecedented manufacturing flexibility. Like traditional thermoset prepreg resins, **VITRIMAX** resins come in 2 parts which can be mixed and applied using standard prepreg practices. Once cured, these materials produce highly crosslinked network polymers for structural stability. However, unlike traditional thermoset prepreg, **VITRIMAX** resins enable post-cure processing to change shape. After impregnation, the prepreg can be partially or fully cured for extended shelf life at room temperature and reduced in-mold time during production. **VITRIMAX** relies on  $T_g$ -dependent covalent chemical bond welding at the surface of laminates that creates a fully crosslinked thermoset and resultant stability. Akin to thermoplastic prepreg, **VITRIMAX** enables fast and reliable heat welding, via compression molding, of prepreg laminates, while the covalent bonds yield the strength of the thermoset network. Unlike thermoplastic prepreg, **VITRIMAX** does not require long melting and cooling periods for part production, simply heat to the defined  $T_g$  range to activate bonding.

## APPLICATIONS AND USE

**VITRIMAX** T100 was designed for protective sports equipment that can be molded and reshaped for a custom fit by the end user when the final product is heated above  $T_g$ . **VITRIMAX** T100 has a glass transition temperature of 100 °C, while having the added benefit of full end of life recyclability.

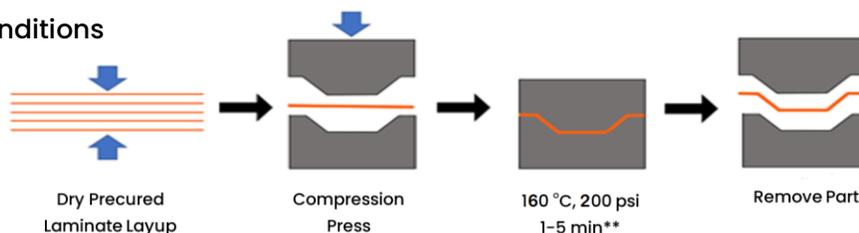
## BENEFITS AND FEATURES

- Reshapability above  $T_g$  (end user customizable)
- Pre-cured prepreg exhibits indefinite ambient shelf-life
- Rapid and high throughput, out-of-autoclave, compression molding
- Complete end-of-life recyclability of resin and fiber

## CURE AND HANDLING

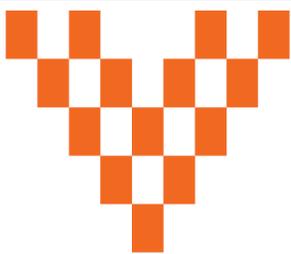
Oven-treat prepreg for 60 minutes at 135 °C. The pre-cured prepreg can now be stored at RT and reprocessed into a component via rapid heat molding as described below.

### Rapid Heat Mold Conditions



\*\*Dwell time depends upon the number of plies in a laminate:

**5 plies:** 1 minute (160 °C, 200 psi) / **15 plies:** 3 minutes (160 °C, 200 psi) / **30 plies:** 5 minutes (160 °C, 200 psi)



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## RESIN PHYSICAL PROPERTIES

PHYSICAL PROPERTIES	VALUE	UNIT	TEST
Color	yellow to red	-	-
Mix Ratio	2.5:1	imine:epoxy	-
Initial Viscosity at 70 °C	30,000	cP	ASTM D2196
Pot life at 70 °C	90	minutes	-
Cured Resin Density	1.05	g/cm <sup>3</sup>	ASTM D792-20
Moisture Uptake	<1	Weight %	ASTM D570
Flexural Strength	130	MPa	ASTM D790
Flexural Modulus	3200	MPa	ASTM D790
Cured Resin Tg	100	°C	ASTM 7028

## CURED CARBON FIBER PREPREG PROPERTIES

PHYSICAL PROPERTIES	VALUE	UNIT	TEST
Fiber	2585-12K	-	-
Weave	Unidirectional	-	-
Fiber Mass	139	g/m <sup>2</sup>	-
Nominal Cured Ply Thickness	0.15	mm	-
Nominal Fiber Volume	62	%	-
Fiber Density	0.93	g/cm <sup>3</sup>	-
Glass Transition Temperature	100	°C	ASTM D7028
Tensile Strength	130	ksi	ASTM D3039
Tensile Modulus	10	msi	
Flexural Strength	116	ksi	ASTM D7264
Flexural Modulus	18	msi	
Compressive Strength	90	ksi	ASTM D3410-16
ILSS	6	ksi	ASTM D2344

### STORAGE AND HANDLING

Shelf Life: Mallinda's VITRIMAX T100 resin has a shelf life of 1 year if left unopened. The resin should be stored in dry storage temperature of 5-60 °C.

Disposal of any unused materials should be in accordance with state and federal regulations. VITRIMAX T100 offers full end of life recyclability for reuse of all materials.

### PRECAUTIONS FOR USE

Typical preventative measures should be taken when handling vitrimer resins and fibrous materials. Airborne fibers as a result of sawing, grinding, etc. can present health hazards. It is advised that the user, prior to interaction with the materials, observes the guidelines set forth in the Material Safety Data Sheet available upon request for this product. Users of the product are advised to wear clean, disposable nitrile gloves which provide protection as well as reduce the possibility of contamination of the material.

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