

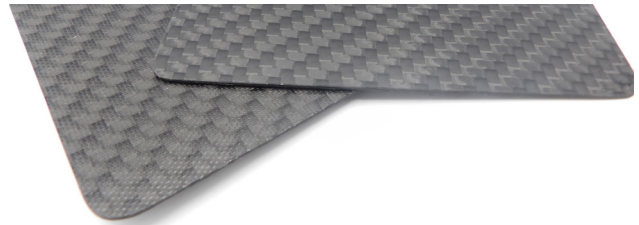
## PRODUCT DATA SHEET

### DESCRIPTION

Toray PMC CFRT® (TW-2000-1L EB®) is a reinforced thermoplastic composite laminate. It blends the benefits of a thermoplastic polymer matrix with woven carbon fibers in a twill weave for enhanced shaped and performance. The TW-2000-1L EB® style laminate is available in a single-layer product; carbon in both directions (0° and 90°) coated with ENVIR-BOND™ (EB®) to reduce the need for harmful solvents and enhance the injection overmolding process. The TW-2000-1L EB® laminate is ultra-thin, lightweight, and resilient for improved energy return.

### FEATURES

- › Twill weave of carbon fibers
- › Bi-directional reinforcement
- › EB® tie-layers enhance bondability for injection overmolding.
- › Available in natural (carbon) color



### PRODUCT TYPE AND COMPOSITION

Carbon fiber content: 36%  
 Polyurethane content: 18%  
 Modified PMMA thermoplastic resin 46%  
 (Noted: Percentages are by volume and are nominal values)

### TYPICAL APPLICATIONS

- › Footwear
- › Recreational equipment
- › Skates

### SHELF LIFE

Stable indefinitely at 25°C (77°F)

Materials must be dried prior to heating and thermoforming.  
 Please refer to the TPMC Processing Instructions.

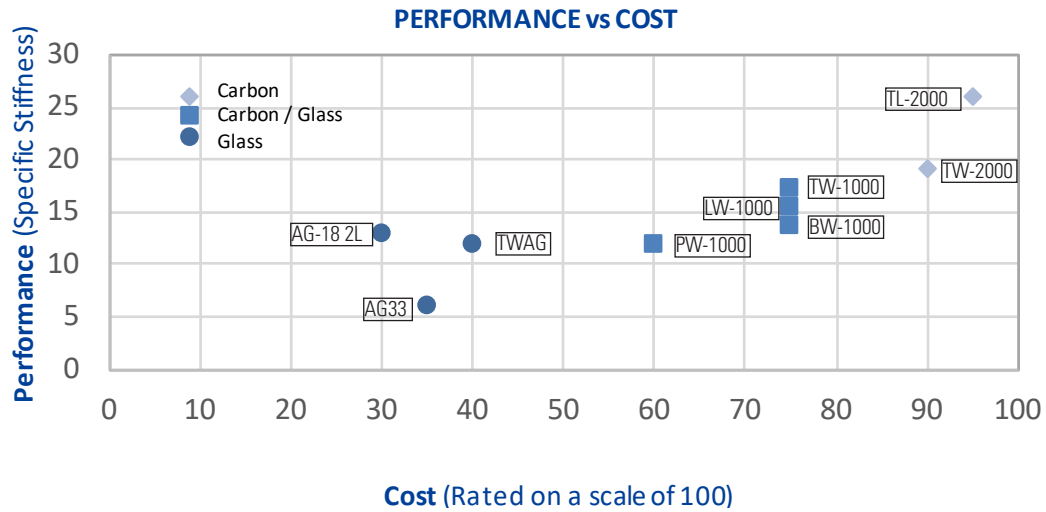
### MATERIAL PARAMETERS

Specific Gravity	1.5 ± 0.15 (calculated based upon material volume)
Thickness	0.85 mm (± 0.15 mm)
Size	Cut to customer specifications from sheet of 91 x 122 cm (36 x 48 inches)
Color	Natural (carbon)
Forming Temperature	195°C to 200°C (383°F–392°F)
Bonding Temperature	55°C to 60°C (131°F–140°F)



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## MECHANICAL PROPERTIES

Properties	Method	Results
Flexural Rigidity	ASTM D790-10	36 N-cm*
Flexural Strength	ASTM D790-10	195 MPa*
Flexural Modulus	ASTM D790-10	6000 MPa*
T <sub>g</sub>	ASTM D3418-15	110°C

\*Averaged results per testing performed on 0.9 mm thickness.

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### ENVIR-BOND® PRODUCT IDENTIFICATION

Chemical Family	Aromatic thermoplastic polyurethane
Chemical Name	Polyurethane elastomer
Hazardous Components	This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

### ENVIR-BOND® PHYSICAL AND CHEMICAL PROPERTIES

Form	Solid
Appearance	Plastic Film
Color	Natural
Odor	Odorless
pH	Not Applicable
Melting Point	150–200°C (302–392°F)
Boiling Point/Range	Not Applicable
Point	> 210°C (> 410°F)
Lower Explosion Limit	Not Established
Upper Explosion Limit	Not Established
Vapor Pressure	Not Applicable
Density	Not Applicable
Specific Gravity	1.1–1.3
Solubility in Water	Insoluble
Temperature	Not Applicable
Decomposition Temperature	Begins at 250°C (482°F)
Hazardous Reactions	Hazardous polymerization does not occur
Stability	Stable

### MASSACHUSETTS, NEW JERSEY OR PENNSYLVANIA RIGHT TO KNOW SUBSTANCE LISTS

Weight %	Components	CAS - No.
> = 1%	Polyurethane Polyester Elastomer	CAS# is a trade secret
> = 1%	Thermoplastic Polyurethane	-

*Note: Remove protective film from surface prior to processing.*

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