

## PRODUCT DATA SHEET

## DESCRIPTION

Toray PMC CFRT® (TW-1000 401EB®) is a reinforced thermoplastic composite laminate. It blends the benefits of a thermoplastic polymer matrix with woven carbon and glass fibers in a twill weave for enhanced shapes and performance. The TW-1000 401EB® style laminate is available in a single-layer product; carbon in one direction and glass fibers at a 90° orientation to the carbon that is ultra-thin, lightweight, and resilient for improved energy return.

Envir-Bond® is TPMC's newest material innovation to improve the ease of processing at the factory level and help reduce the amount of harmful solvents used in the footwear manufacturing process. EB® "tie-layers" are added for injection overmolding.

## FEATURES

- › Twill weave of carbon and glass fibers
- › Bi-directional reinforcement
- › Highest mechanical properties of our woven fabrics
- › Lightest weight, thin, single layers
- › Available in stock and custom colors



## PRODUCT TYPE AND COMPOSITION

Carbon fiber content: 20%  
Glass fiber content: 20%  
TPU/PMMA proprietary thermoplastic resin: 48%  
Polyurethane Based Coating: 12%  
(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	1.05 mm (± 0.15 mm)
Size	Cut to customer specifications from sheet of 91 x 122 cm (36 x 48 inches)
Standard Colors	Silver, Charcoal, and Black
Forming Temperature	195° to 200°C (383°F–392°F)
Bonding Temperature	55°C to 60°C (131°F–140°F)



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**CFRT®**

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## MECHANICAL PROPERTIES

Properties	Results	
Flexural Rigidity	ASTM D790-10	< 80 N-cm
Flexural Strength	ASTM D790-10	> 140 MPa*
Flexural Modulus	ASTM D790-10	> 7000 MPa*

\*Results based upon testing 1.09 mm thickness material in carbon direction.

TW-1000 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	-

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