

## PRODUCT DATA SHEET

### DESCRIPTION

Toray PMC CFRT® (TW-2000 1L & 2L) 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 performance. The TW-2000 1L & 2L style laminate is available in a single or multilayer product; carbon fiber reinforcement at 0° and 90° orientations that is ultra-thin, lightweight, and resilient for improved energy return.

### FEATURES

- › Twill weave of 12K carbon fibers
- › Bi-directional carbon reinforcement
- › Lightest weight and thin
- › Color: Black (natural carbon)
- › Available with ENVIR-Bond® tie layers for injection overmolding.



### PRODUCT TYPE AND COMPOSITION

Carbon (12K) fiber content: 58%  
Modified PMMA thermoplastic resin: 42%  
(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	1.44 g/cc
Thickness	Available in single or multiple laminates
Size	Cut to customer specifications from sheet of 91 x 122 cm (36 x 48 inches)
Standard Colors	Black (natural carbon)
Forming Temperature	195°C to 200°C (383°F–392°F)
Bonding Temperature	55°C to 60°C (131°F–140°F)

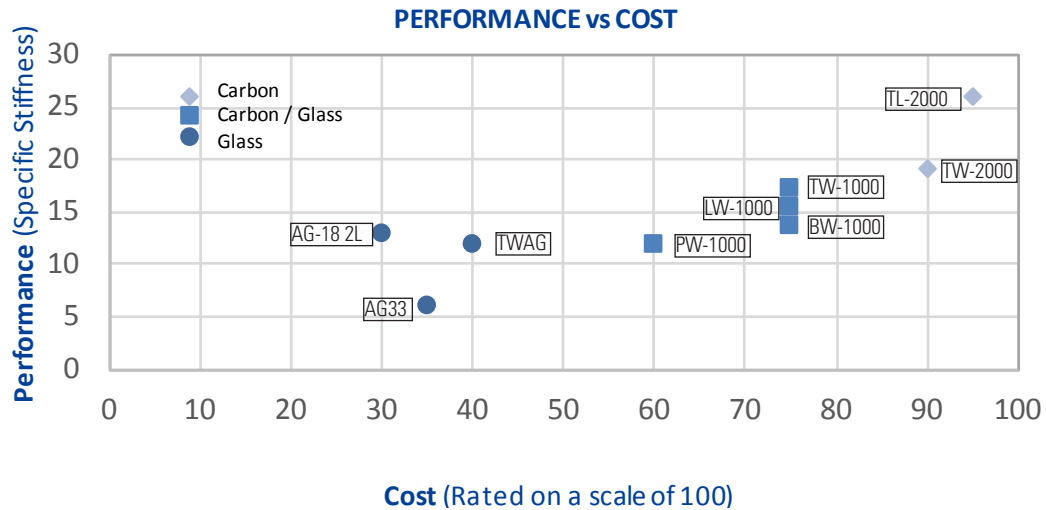


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## MECHANICAL PROPERTIES

Properties	Condition	Method	1L** Results:	2L*** Results:
Flexural Rigidity	RTD	ASTM D790-10	~ 47.6 N-cm	~ 450 N-cm
Flexural Modulus	RTD	ASTM D790-10	~ 22.8 GPa	~ 35.1 GPa
Flexural Strength	RTD	ASTM D790-10	> 450 MPa	> 530 MPa
Thickness	—	*SI-QA-047	0.70 mm ± 0.15 mm	1.27 mm ± 0.15 mm

\*SI-QA-047 is an internal Toray PMC inspection process

Note: Material properties and thickness listed above are of the base panel without ENVIR-Bond® layers.

\*\*Tested at 0.67 mm thickness

\*\*\*Tested at 1.32 mm thickness

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