

PRODUCT DATA SHEET

DESCRIPTION

Toray TC1810 is a preceramic prepreg system designed to handle service temperatures ranging from 260°C (500°F) up to 1000°C (1832°F) with little to no weight loss. TC1810 is a high temperature polysiloxane based thermoset prepreg designed for excellent thermo-mechanical performance but still easy to process at lower temperatures with both hand lay-up and automated fiber placement. TC1810 has great ablative properties meeting the most demanding requirements and temperature profiles. TC1810 provides unique co-curable capabilities to improve manufacturability, structural performance, and operating temperature. TC1810 is the next generation of material systems for the most challenging environments.

FEATURES

- ▶ Retention of mechanical properties at high temperatures
- ▶ Low-temperature processing with standard thermoset techniques including AFP
- ▶ High temperature resistance
- ▶ Fireproof per FAA Aircraft Materials Fire Test Handbook Chapter 12- Powerplant Fire Penetration Test (1093°C [2000°F] for 15 minutes)
- ▶ Multi-compatible co-cure capability

PRODUCT TYPE AND COMPOSITION

225°C (437°F) with post cure as needed
Preceramic polysiloxane

TYPICAL NEAT RESIN PROPERTIES

Resin Density	1.2
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TYPICAL APPLICATIONS

- ▶ Heat Shields
- ▶ Aerospace Engine Exhaust
- ▶ Battery Enclosure
- ▶ Defense, Thermal Protection Systems (TPS)
- ▶ Automated and Hand Lay-Up Fabrication Process
- ▶ Rocket Nozzles
- ▶ Leading Edges (Mach 5)

SHELF LIFE

Out Life:	Up to 30 days at ambient
Frozen Storage Life:	12 months at -18°C (< 0°F) or below

Out life is the maximum time allowed at ≤ 21°C (70°F) and ≤ 60% RH before cure.

*Out life tested by SBS on a 15 cm x 15 cm (6" x 6") laminate, cured in an autoclave. Users will need to evaluate their own out life limits based on thickness, size, and complexity of their own parts.



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MECHANICAL PROPERTIES — T1100GC-24K, 135GSM, 34%RC

Property	Condition	Method	Results	
Tensile Strength 0°	RTA	ASTM D 3039	3034 MPa	440 ksi
Tensile Modulus 0°	RTA	ASTM D 3039	181.0 GPa	26.4 Msi
Tensile Strength 90°	RTA	ASTM D 3039	11.3 MPa	1.6 ksi
Tensile Modulus 90°	RTA	ASTM D 3039	4.48 GPa	0.65 Msi
Compression Strength 0°	RTA	ASTM D 6641	427 MPa	62 ksi
Compression Modulus 0°	RTA	ASTM D 6641	203.4 GPa	29.5 Msi
Short Beam Shear ILSS	RTA	ASTM D 2344	20.7 MPa	3.0 ksi
Flexural Strength	RTA	ASTM D 790	531 MPa	77 ksi
Flexural Modulus	RTA	ASTM D 790	77.9 GPa	11.3 Msi

Notes:

Cure cycle used was at 225°C (437°F) final cure temperature for 3 hours.

Room Temperature Ambient (RTA).

All properties normalized to 60% fiber volume except ILSS.

Compression testing per D6641 used a cross ply laminate with a backout factor applied to obtain 0 degree result.

Preliminary dataset based on limited lot data.

Additional high temperature cure datasets and elevated temperature testing are in process contact Toray for more details.



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OXYACETYLENE TEST BED (OTB)

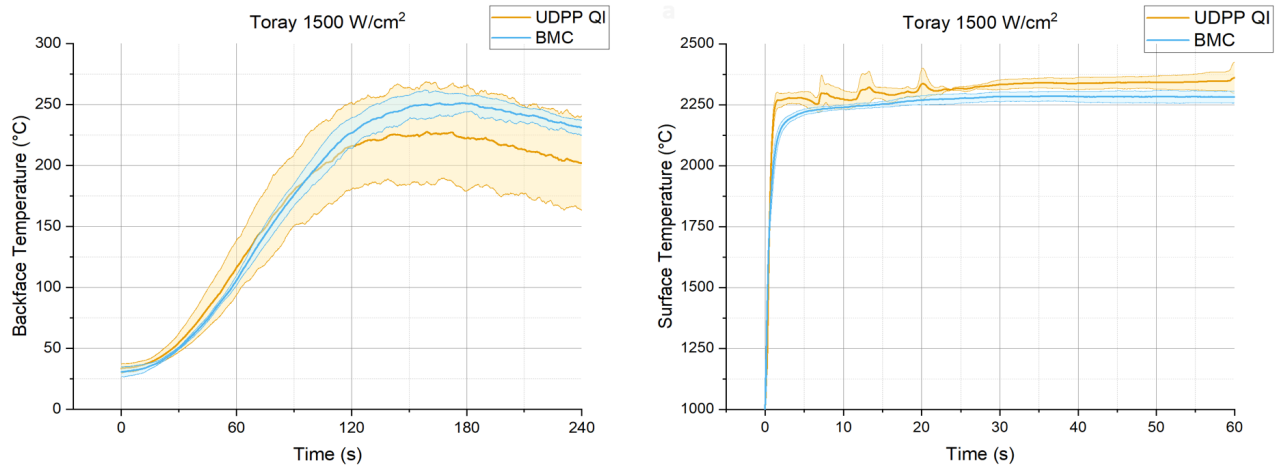


Figure 1. (a) Average surface temperatures of Carbon/TC1810 materials. (b) Average backface temperatures of Carbon/TC1810 materials.

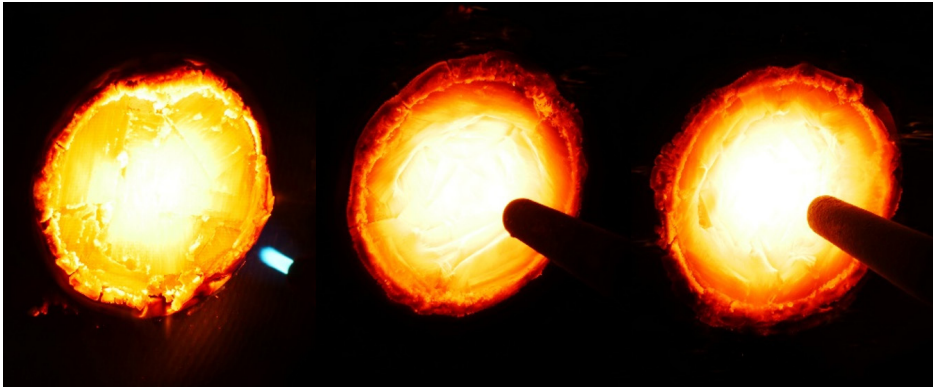


Figure 2. 60s sample surface images from photogrammetry cameras

CURE SCHEDULE

See Toray Advanced Composites for details.

COMPOSITE LAMINATE STACKING SEQUENCE

See Toray Advanced Composites for details.