

TR1185 TCR™ RESIN SYSTEM



Technical Data Sheet

TR1185 is a specialty-formulated toughened resin, with a glass transition temperature around 200 °C (392 °F). The TR1185 prepreg resin system has an excellent balance of thermal and structural properties, with exceptional shelf-life at room temperature. TR1185 also meets the FST requirements set by the aerospace industry for selective fiber reinforcement and part thicknesses.

Available Prepreg Product Formats

- Tow (roving)
- Woven form/fabric
- Unidirectional tape

Typical Applications

- Aerospace
- Industrial
- Structural

Shelf Life

- 12 months at -18°C (0°F)
- 3 months at 24°C (75°F)

Benefits/ Features

- High toughness
- Meets FST (Fire, Smoke, Toxicity) performance when tested on select fiber reinforcements and at specified specimen thickness
- High glass transition temperature (T_g)

Cure Conditions

Curing cycle for composite parts <6.35 mm or 0.25 inches in thickness

- Ramp at 2.3°C/min to 177°C (350°F)
- Hold for 4 hours at 177°C
- Ramp ≤2°C/min to ≤ 66°C (150°F)

Thick composite parts (>6.35 mm 0.25 inches) will require a modified cure cycle. Please contact TCR Composites for more information.

Cured Neat Resin Physical Properties*

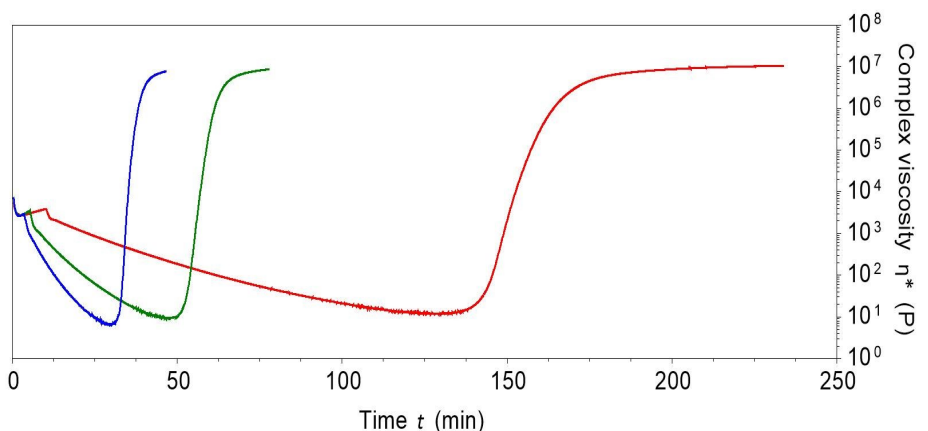
Properties	Metric	English	Test Method
Density	1.24 g/cc	0.0448 lbs/in ³	ASTM D 792
Tensile Strength	66.5 MPa	9.65 kpsi	ASTM D 638
Tensile Modulus	3.11 GPa	451 kpsi	ASTM D 638
Strain (% Elongation)	2.24%		ASTM D 638
Poisson's Ratio	0.33		ASTM D 638
DMA – Dry Glass Transition			
Glass Transition – E" Peak	200°C	392°F	ASTM E 1640
Glass Transition – E' Onset	190°C	374°F	ASTM E 1640
Glass Transition – Tan δ Peak	210°C	410°F	ASTM E 1640
DMA – Wet Glass Transition**			
Glass Transition – E" Peak	130°C	266°F	ASTM E 1640
Glass Transition – E' Onset	120°C	248°F	ASTM E 1640
Glass Transition – Tan δ Peak	155°C	311°F	ASTM E 1640
Water Absorption**	3.25%		ASTM D 570

*Cure cycle: 4 hours at 177°C

**DMA wet glass transition and water absorption measured after 24-hour water boil

Resin Cure Viscosity

Parallel-plate rheometer



0.56°C (1°F)/min—Min η^* : 11.44 P, 102°C (216°F)

1.67°C (3°F)/min—Min η^* : 8.82 P, 110°C (230°F)

2.78°C (5°F)/min—Min η^* : 6.26 P, 113°C (235°F)

TCR Composites

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Composite Properties

Reinforcement: Standard modulus 12K tow carbon fiber: T700SC-12K-50C.

Composite properties are normalized to 60% fiber volume and expressed to two significant figures.

Cure cycle: 4 hours at 177°C (350°F) via vacuum bag oven cure, tests conducted at 22°C (72°F)

Properties	Metric	English	Test Method
0° Tensile Strength	1.4 GPa	200 kpsi	ASTM D3039
0° Tensile Modulus	140 GPa	20 Mpsi	ASTM D3039
0° Tensile Percent Strain	1.1%		ASTM D3039
90° Tensile Strength	18 MPa	2.6 kpsi	ASTM D3039
90° Tensile Modulus	7.0 GPa	1.0 Mpsi	ASTM D3039
0° Compressive Strength	1.4 GPa	210 kpsi	SACMA SRM 1R-94
0° Compression Modulus	74 GPa	11 Mpsi	SACMA SRM 1R-94
90° Compression Strength	140 MPa	20 kpsi	SACMA SRM 1R-94
90° Compression Modulus	9.1 GPa	1.3 Mpsi	SACMA SRM 1R-94
Short Beam Strength	68 MPa	9.9 kpsi	ASTM D2344
Flexural Strength	2.1 GPa	300 kpsi	ASTM D790
Flexural Modulus	130 GPa	19 Mpsi	ASTM D790
Composite Density	1.5 g/cc	0.055 lbs/in ³	ASTM D792
Fracture Toughness G _{IC}	120 J/m ²	0.66 in*lb/in ²	ASTM D5528

Fracture Toughness in Fabric Composites– Reinforcement: 7781 E-glass, 300 gsm fabric

Properties	Metric	English	Test Method
Fracture Toughness G _{IC}	370 J/m ²	2.1 in*lb/in ²	ASTM D5528

Fracture Toughness in Fabric Composites– Reinforcement: T300-3K Carbon, 200 gsm fabric

Properties	Metric	English	Test Method
Fracture Toughness G _{IC}	230 J/m ²	1.3 in*lb/in ²	ASTM D5528

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Flame Resistance

FAR 25.853 Appendix F, Part I, Reinforcement: T700SC-12K-50C tow carbon fiber—4 mm sample thickness

Test	Results	Limit	Pass/Fail
Extinguish Time (sec)	2	15	Pass
Burn Length (inch)	0.1	6	Pass
Drip Count	0	3	Pass

Smoke Density

Boeing Doc BSS 7238, Rev C, Reinforcement: T700SC-12K-50C tow carbon fiber—4 mm sample thickness

Test	Results	Limit	Pass/Fail
D _{s_max} (4 seconds)	86	200	Pass

Smoke Toxicity

Boeing Doc BSS 7239 Rev A, Reinforcement: T700SC-12K-50C tow carbon fiber—4 mm sample thickness

Properties	Results	Limit	Pass/Fail
CO (ppm)	175	-	-
SO ₂ (ppm)	0	100	Pass
NO/NO ₂ (ppm)	18	100	Pass
HCN (ppm)	5	150	Pass
HCl (ppm)	63	500	Pass
HF (ppm)	93	200	Pass

Cure Profiles

Option	Ramp Up	Hold Temperature	Hold Time (hours)	Ramp Down
1	2.3°C/min (4.1°F/min)	177°C (350°F)	4	≤2.3°C/min (4.1°F/min)

All values presented within this technical data sheet are expected ranges based on actual test data. Since values are dependent on specimen preparation and test method, TCR Composites cannot guarantee that these properties will be obtained in all cases. Data should be used only as an indication, since part or component properties are highly dependent on user process and design. It is recommended that end users determine the suitability of this material for each application through their own testing and evaluation. **TCR™** is a trademark of TCR Composites, Inc.

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