

TR1116 TCR RESIN SYSTEM



Technical Data Sheet

TR1116 is room temperature stable, snap-cure epoxy prepreg resin system that is designed specifically for press cure applications. Composite parts can be cured as fast as 2 minutes at 177°C (350°F) and de-molded hot for quick processing.

Available Prepreg Product Formats

- Woven form/fabric
 - Carbon
 - Glass
- Tow (roving)

Typical Applications

- Sporting goods
- Automotive

Shelf Life

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

Benefits/ Features

- Snap cure capability
- In hot/out hot processing
- Tailored flow and tack levels
- Good surface finish

Cure Conditions

Press cure conditions:

Minimum pressure of 30 psi recommended

Curing cycle for composite parts <0.25 inches in thickness

- 2 minutes at 177°C (350°F)
- 5 minutes at 154°C (310°F)
- 10 minutes at 132°C (270°F)

Thick composite parts (>0.25 inches or 6.35 mm) will require a modified cure cycle.

Out-of-autoclave (OOA) oven cure conditions are feasible, but snap cure times are not achieved.

Please contact TCR Composites for more information if either of these two curing conditions are required for the intended end-use application.

Cured Neat Resin Physical Properties*

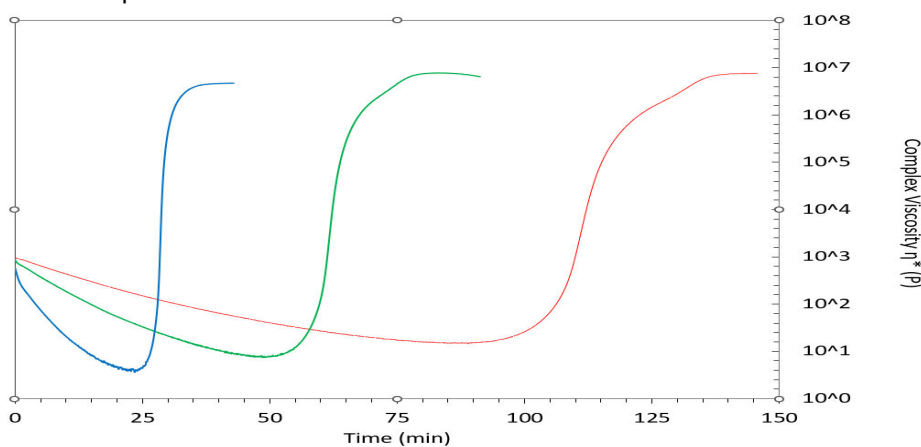
Properties	Metric	English	Test Method
Density	1.22 g/cc	0.0441 lbs/in ³	ASTM D 792
Tensile Strength	75.8 MPa	11 kpsi	ASTM D 638
Tensile Modulus	3.44 GPa	500 kpsi	ASTM D 638
Strain (% Elongation)	2.53%		ASTM D 638
DMA – Dry Glass Transition			
Glass Transition – E" Peak	138°C	280°F	ASTM E 1640
Glass Transition – E' Onset	137°C	278°F	ASTM E 1640
Glass Transition – Tan δ Peak	146°C	294°F	ASTM E 1640
DMA – Wet Glass Transition**			
Glass Transition – E" Peak	76°C	169°F	ASTM E 1640
Glass Transition – E' Onset	66°C	151°F	ASTM E 1640
Glass Transition – Tan δ Peak	85°C	185°F	ASTM E 1640
Water Absorption**	5.0%		ASTM D 570

*Neat Resin Cure cycle: 1 hour at 130°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^* : 14.41 P, 86°C (186°F)

1.11°C (2°F)/min—Min η^* : 7.395 P, 93°C (199°F)

2.78°C (5°F)/min—Min η^* : 3.60 P, 106°C (223°F)

(η^*) Time to Viscosity Minimum: $\{(\text{Min } \eta^* \text{ Temperature (}^\circ\text{C/}^\circ\text{F)} - (38^\circ\text{C}/100^\circ\text{F)}) \div \{(\text{}^\circ\text{C/}^\circ\text{F)/min}\}$

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Composite Properties

Reinforcement: Standard modulus 3K carbon twill at 42% RC. Properties are normalized to 55% fiber volume.

Cure cycle: Press cured 177°C 2 minutes at 30 psi.

Properties	Metric	English	Test Method
Short Beam Strength	73.7 MPa	10.7 kpsi	ASTM D2344
Flexural Strength	0.78 GPa	113 kpsi	ASTM D0790
Flexural Modulus	45.3 GPa	6.58 Mpsi	ASTM D0790
0° Tensile Strength	0.73 GPa	107 kpsi	ASTM D3039
0° Tensile Modulus	69 GPa	10 Mpsi	ASTM D3039
0° Compressive Strength	0.61 GPa	88.6 kpsi	SACMA SRM 1R-94

Cure Profiles*

Option	Temperature	Time (minutes)
1**	177°C (350°F)	2
2**	154°C (310°F)	5
3	132°C (270°F)	10

*Minimum pressure of 30 psi is recommended. Prepreg is placed in a hot press and demolded hot after the cure.

**For the cure cycle recommendations 1 and 2, used in applications in which the TR1116 cured composite will be demolded from a hot press or mold, it is highly recommended that the part temperature be allowed to cool below 137 °C prior to demolding. Above 137 °C, which is the Tg of the resin, TR1116 composite parts are highly sensitive to deflection and deformation resulting from any external mechanical forces.

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.

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