

UF3369 TCR RESIN SYSTEM



Technical Data Sheet

UF3369 is a solvent-free, controlled flow epoxy-based resin. This prepreg system has excellent mechanical properties, long room temperature shelf life, and demonstrates exceptional performance in COPV applications utilizing Type 3 and Type 4 liners.

Available Prepreg Product Formats

- Tow (roving)

Typical Applications

- High pressure COPV Tanks
- Rocket motor cases
- Sporting goods

Shelf Life

- 18 months at -18°C (0°F)
- 6 months at 4°C (40°F)
- 3 months at 24°C (75°F)
- 1.5 months at 32°C (90°F)

Benefits/ Features

- Low cure temperature
- High fiber strength translation in pressure vessel (COPV) applications with fibers possessing tensile strengths greater than 700 kpsi
- Tailored flow and tack levels

Cure Conditions

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

- Ramp ≤ 2.78°C/min to 121°C (250°F)
- Hold for 4 hours at 121°C
- Ramp ≤ 2.78°C/min to ≤ 66°C (150°F)

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

Cured Neat Resin Physical Properties*

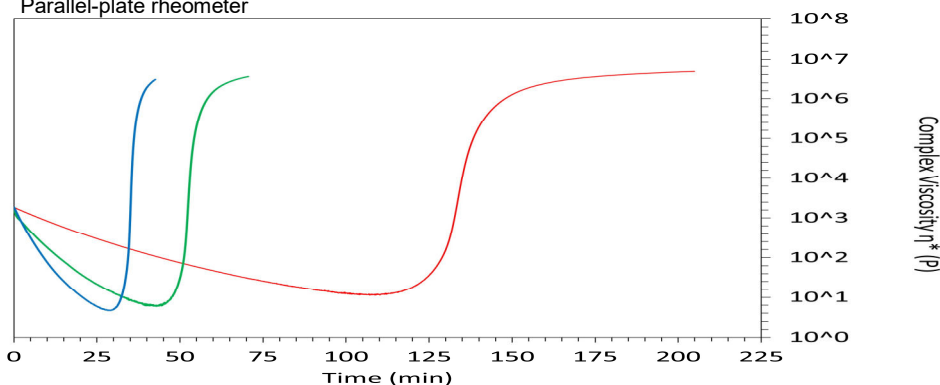
Properties	Metric	English	Test Method
Density	1.18 g/cc	0.0441 lbs/in ³	ASTM D 792
Tensile Strength	92.4 MPa	13.4 kpsi	ASTM D 638
Tensile Modulus	3.10 GPa	445 kpsi	ASTM D 638
Strain (% Elongation)	3.6%		ASTM D 638
Poisson's Ratio	0.20		ASTM D 638
Fracture Toughness – K _{IC}	0.81 MPa*m ^{1/2}	740 psi*in ^{1/2}	ASTM D 5045
DMA – Dry Glass Transition			
Glass Transition – E" Peak	117°C	243°F	ASTM E 1640
Glass Transition – E' Onset	116°C	241°F	ASTM E 1640
Glass Transition – Tan δ	131°C	268°F	ASTM E 1640
DMA – Wet Glass Transition**			
Glass Transition – E" Peak	67°C	153°F	ASTM E 1640
Glass Transition – E' Onset	62°C	144°F	ASTM E 1640
Glass Transition – Tan δ	78°C	173°F	ASTM E 1640
Water Absorption**	5.0%		ASTM D 570

*Cure cycle: 4 hours at 121°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^* : 11.22 P, 98°C (208°F)

1.67°C (3°F)/min—Min η^* : 5.88 P, 112°C (234°F)

2.78°C (5°F)/min—Min η^* : 5.02 P, 120°C (248°F)

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

TCR Composites

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TDS-RD-0001-R005-UF3369

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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 121°C (250°F) via vacuum bag oven cure, tests conducted at 22°C (72°F)

Properties	Metric	English	Test Method
0° Tensile Strength	2.5 GPa	360 kpsi	ASTM D3039
0° Tensile Modulus	160 GPa	23 Mpsi	ASTM D3039
0° Tensile Percent Strain	1.6 %		ASTM D3039
90° Tensile Strength	35 MPa	5.0 kpsi	ASTM D3039
90° Tensile Modulus	8.3 GPa	1.2 Mpsi	ASTM D3039
0° Compressive Strength	1.4 GPa	210 kpsi	SACMA SRM 1R-94
0° Compression Modulus	1.0x10 ² GPa	15 Mpsi	SACMA SRM 1R-94
90° Compression Strength	230 MPa	33 kpsi	SACMA SRM 1R-94
90° Compression Modulus	18 GPa	2.6 Mpsi	SACMA SRM 1R-94
Short Beam Strength	62 MPa	9.0 kpsi	ASTM D2344
Flexural Strength	1.9 GPa	290 kpsi	ASTM D790
Flexural Modulus	120 GPa	18 Mpsi	ASTM D790

Composite Outgas Properties-Reinforcement: T700SC-12K-50C

Requirement	Result	Limit	Pass/Fail	Test Method
TML	0.25 %	<1.00%	Pass	ASTM E595
CVCM	<0.02 %	<0.1%	Pass	
WVR	0.22	N/A	Pass	

TML	CVCM	WVR
Total Mass Loss	Collected Volatile Condensable Material	Water Vapor Recovered

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Cure Profiles

Option	Ramp Up	Hold Temperature	Hold Time (hours)	Ramp Down
1	≤2.78°C/min (5°F/min)	121°C (250°F)	4	≤2.78°C/min (5°F/min) to 66°C (150°F) or less
2*		121°C (250°F)	1.5	
3		110°C (230°F)	6	
4		99°C (210°F)	24	

*This cure cycle does not produce the maximum Tg; but will be suitable for well-cured, highly cross-linked and solidified resin. Expected Tg value of 104°C (219°F). Highest performance is obtained with a 4-hour hold at 121°C (250°F).

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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