UF3360 TCR Resin System

Technical Data Sheet

UF3360 is a solvent-free, controlled flow epoxy based resin. This prepreg system has an intermediate glass transition temperature, good mechanical properties, long room-temperature shelf life, and is suitable for use in Out-Of-Autoclave (OOA) processing of higher temperature applications.

Available Prepreg Product Formats
- Tow (roving)
- Woven form/fabric
- Unidirectional tape
- Braid

Typical Applications
- High temperature applications
- Composite overwrapped pressure vessels (COPV)

Shelf Life
- 24 months at -18°C (0°F)
- 6 months at 24°C (75°F)
- 3 months at 32°C (90°F)

Benefits/ Features
- Intermediate glass transition (Tg)
- Tailored flow and tack levels
- Excellent outgas performance

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

- Ramp ≤ 2.78°C/min to 177°C (350°F)
- Hold 1 hour at 177°C
- Ramp ≤ 2.78°C/min ≤ 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.

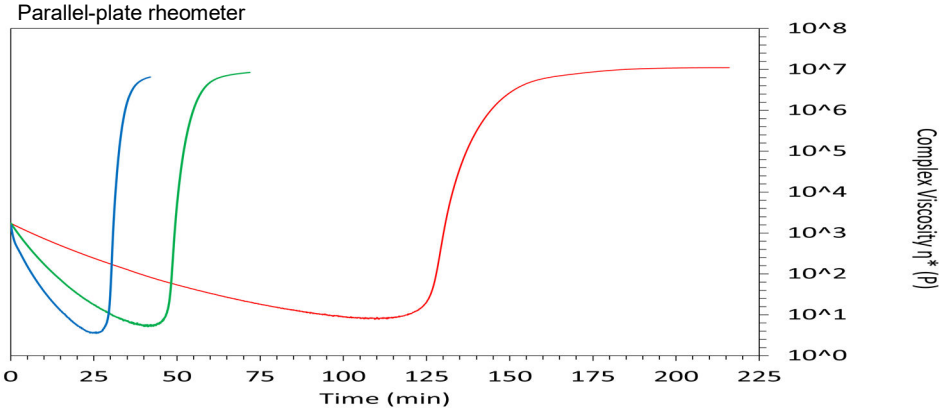
Cured Neat Resin Physical Properties*

Properties	Metric	English	Test Method
Density	1.20 g/cc	0.0433 lbs/in^3	ASTM D 792
Tensile Strength	69 MPa	10 kpsi	ASTM D 638
Tensile Modulus	3.17 GPa	460 kpsi	ASTM D 638
Strain (% Elongation)	3.5%		ASTM D 638
Poisson's Ratio	0.30		ASTM D 638
Fracture Toughness – K_{IC}	0.532 MPa*m$^{1/2}$	484 psi*in$^{1/2}$	ASTM D 5045
DMA – Dry Glass Transition			
Glass Transition – E" Peak	166°C	331°F	ASTM E 1640
Glass Transition – E' Onset	161°C	321°F	ASTM E 1640
Glass Transition – Tan δ Peak	180°C	357°F	ASTM E 1640
DMA – Wet Glass Transition**			
Glass Transition – E" Peak	114°C	237°F	ASTM E 1640
Glass Transition – E' Onset	112°C	234°F	ASTM E 1640
Glass Transition – Tan δ Peak	133°C	271°F	ASTM E 1640
Water Absorption**	3.3%		ASTM D 570

*Cure cycle: 1 hour 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*: 7.71 P, 100°C (212°F)

1.67°C (3°F)/min—Min η*: 5.14 P, 109°C (228°F)

2.78°C (5°F)/min—Min η*: 3.52 P, 115°C (239°F)

(η*) Time to Viscosity Minimum: {(Min η* Temperature (°C/°F) – (38°C/100°F)} ÷ {(°C/°F)/min}

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Composite Properties

Reinforcement: Standard modulus 12K tow carbon fiber: T700SC-12K-50C.
Composite properties normalized to 60% fiber volume and expressed to two significant figures.
Cure cycle: 1 hour 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	1.8 GPa	260 kpsi	ASTM D3039
0° Tensile Modulus	150 GPa	22 Mpsi	ASTM D3039
0° Tensile Percent Strain	0.63%		ASTM D3039
90° Tensile Strength	23 MPa	3.3 kpsi	ASTM D3039
90° Tensile Modulus	8.3 GPa	1.2 Mpsi	ASTM D3039
0° Compressive Strength	1.5 GPa	220 kpsi	SACMA SRM 1R-94
0° Compression Modulus	96 GPa	14 Mpsi	SACMA SRM 1R-94
90° Compression Strength	210 MPa	30 kpsi	SACMA SRM 1R-94
90° Compression Modulus	16 GPa	2.3 Mpsi	SACMA SRM 1R-94
Short Beam Strength	62 MPa	9.0 kpsi	ASTM D2344
Flexural Strength	20 GPa	290 kpsi	ASTM D790

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

Requirement	Result	Limit	Pass/Fail	Test Method
TML	0.1 %	<1.00%	Pass	ASTM E595
CVCM	<0.01 %	<0.1%	Pass	
WVR	0.07	N/A	Pass	

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

Cure Profiles

Option	Ramp Up	Hold Temperature	Hold Time (hours)	Ramp Down
1	≤2.78°C/min (5°F/min)	177°C (350°F)	1	≤2.78°C/min (5°F/min) to 66°C (150°F) or less
2		166°C (330°F)	2	
3		154°C (310°F)	3	

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.