

# UF3323 TCR RESIN SYSTEM



Technical Data Sheet

UF3323 is a solvent-free, controlled flow epoxy based resin. This prepreg system has excellent mechanical properties, long shelf life, and is well known as a qualified resin for rocket motor case applications.

## Available Prepreg Product Formats

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

## Typical Applications

- Rocket motor cases
- Large structures

## Shelf Life

- 30 months at -18°C (0°F)
- 1 year at 24°C (75°F)

## Benefits/ Features

- Long room-temperature shelf life
- Tailored flow and tack levels
- Extensive heritage in rocket motor cases
- Good hot-wet glass transition retention
- Excellent outgas performance
- Reduced exotherm in thick composite parts

## Cure Conditions

Curing cycle for composite parts

- Ramp ≤ 2.78°C/min to 138°C (280°F)
- Hold for 24 hours at 138°C
- Ramp ≤ 2.78°C/min to ≤ 66°C (150°F)

## Cured Neat Resin Physical Properties\*

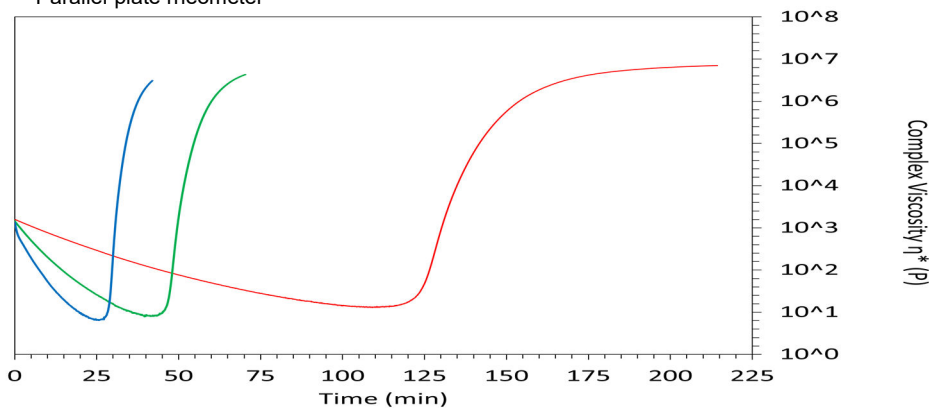
Properties	Metric	English	Test Method
Density	1.21 g/cc	0.0437 lbs/in <sup>3</sup>	ASTM D 792
Tensile Strength	65.5 MPa	9.5 kpsi	ASTM D 638
Tensile Modulus	2.83 GPa	410 kpsi	ASTM D 638
Strain (% Elongation)	5.0		ASTM D 638
Poisson's Ratio	0.37		ASTM D 638
DMA – Dry Glass Transition			
Glass Transition – E" Peak	125°C	257°F	ASTM E 1640
Glass Transition – E' Onset	124°C	255°F	ASTM E 1640
Glass Transition – Tan δ Peak	139°C	283°F	ASTM E 1640
DMA – Wet Glass Transition**			
Glass Transition – E" Peak	96°C	205°F	ASTM E 1640
Glass Transition – E' Onset	93°C	200°F	ASTM E 1640
Glass Transition – Tan δ Peak	110°C	230°F	ASTM E 1640
Water Absorption**	2.5%		ASTM D 570

\*Cure cycle: 24 hours at 138°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  $\eta^*$ : 12.85 P, 101°C (213°F)

1.67°C (3°F)/min—Min  $\eta^*$ : 7.83 P, 106°C (223°F)

2.78°C (5°F)/min—Min  $\eta^*$ : 6.41 P, 115°C (238°F)

( $\eta^*$ ) 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-0103-R001-UF3323

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## Composite Properties

Reinforcement: Intermediate modulus 12K tow carbon fiber: T800SC-12K-50C.

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

Cure cycle: 24 hours at 132°C (280°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
90° Tensile Strength	16 MPa	2.3 kpsi	ASTM D3039
0° Compressive Strength	1.2 GPa	170 kpsi	SACMA SRM 1R-94
Short Beam Strength	69 MPa	10 kpsi	ASTM D2344
Flexural Strength	2.5 GPa	370 kpsi	ASTM D790
Composite Density	1.5 g/cc	0.054 lbs/in <sup>3</sup>	ASTM D792

Reinforcement: Intermediate modulus 24K tow carbon fiber: T800SC-24K-10E.

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

Cure cycle: 24 hours at 138°C (280°F) via vacuum bag oven cure, tests conducted at 22°C (72°F)

Properties	Metric	English	Test Method
0° Tensile Strength	1.20 GPa	170 kpsi	ASTM D3039
90° Tensile Strength	36 MPa	5.2 kpsi	ASTM D3039
0° Compressive Strength	0.68 GPa	98 kpsi	SACMA SRM 1R-94
Short Beam Strength	57 MPa	8.3 kpsi	ASTM D2344
Flexural Strength	2.0 GPa	290 kpsi	ASTM D790
Composite Density	1.5 g/cc	0.054 lbs/in <sup>3</sup>	ASTM D792

## Composite Outgas Properties— Reinforcement: IM10-12K-GP

Requirement	Result	Limit	Pass/Fail	Test Method
TML	0.13 %	<1.00%	Pass	ASTM E595
CVCM	<0.01 %	<0.1%	Pass	
WVR	0.05%	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 Up	Hold Temperature	Hold Time (hours)	Ramp Down
1	≤2.78°C/min (5°F/min)	138°C (280°F)	24	—	—	—	≤2.78°C/min (5°F/min) to 66°C (150°F) or less
2	≤2.78°C/min (5°F/min)	74°C (165°F)	2	≤2.78°C/min (5°F/min)	149°C (300°F)	12	

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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