

# TCR PREPREG RESIN CATALOG



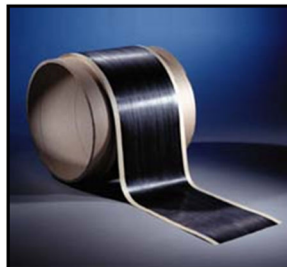
TCR Composites offers unique thermosetting epoxy matrix resin systems featuring a range from one-year to one-month shelf life without refrigeration. These resins are currently used to manufacture prepreg in the following forms: tow/roving, unidirectional tape, woven fabric, and braid.



**Prepreg Tow  
(Towpreg)**



**Prepreg Fabric**



**Prepreg  
Unidirectional Tape**



**Prepreg Braid**

## TCR Prepreg Tow

TCR Prepreg Tow (Towpreg) is the material of choice for clean filament winding. From the highest performance rocket motor cases, to best quality commercial pressure cylinders, you simply cannot find a better towpreg system. TCR Towpregs are designed for high throughput (up to 900 ft / 275 m per minute) to simplify your process. Tow/roving can be impregnated utilizing 6K to 60K standard modulus to high modulus carbon fibers, as well as glass, basalt and aramid with equivalent cross sections.

## TCR Prepreg Fabric

Fabrics, also referred to as “broadgoods,” are used in a wide variety of markets including medical, industrial, infrastructure, aerospace and recreation. TCR prepreg fabrics can be process-tailored for tack and drape as they are ideal for use in either pressure or vacuum bag layup processes. Available fiber forms include carbon, glass, aramid and astroquartz.

## TCR Prepreg Unidirectional Tape

Prepreg unidirectional (UD) tapes can be made in a variety of weights and thicknesses to meet customer requirements. TCR UD tapes are ideal for fabricating composite products that require long lay-up times and thick laminate construction. Our UD tapes are well suited for infrastructure, industrial, and medical applications. We specialize in the manufacture of prepreg UD tapes with a range of 180-600 gsm.

## TCR Prepreg Braid

Braid is a system in which yarns are intertwined, with no two yarns being twisted around one another. Braid is also defined as a family of fabrics continually woven on the bias. Tubular sleeveings are the most common type of prepreg braid. Braid may be used for aerospace, medical, recreational and industrial applications. TCR prepreg braids have low tack, to facilitate the opening of the tubular sleeve, to apply to a molding tool or core. TCR prepreg braids exhibit controlled resin flow during cure, when consolidated with either a shrink tape, vacuum bag, or a matched two-piece mold. Available fiber forms include carbon, glass and aramid.

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Presented values 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. TDS-RD-0114-R002

# TCR PREPREG RESIN CATALOG



## LOW-TEMPERATURE CURE RESINS

TCR Composites offers epoxy matrix resin systems featuring standard 93°C (200°F) and 121°C (250°F) cure temperatures. Resins with a standard 121°C (250°F) cure cycle are tailorable to cure as low as 210°F (99°C). TCR's lower-temperature-cure resins feature a room temperature shelf life ranging from 1-3 months without refrigeration.

### 93°C (200°F) TCR Standard Cure Options

#### TR1112

*Features: High optical clarity, reduced cure exotherm in thick laminates, high fiber strength translation in COPV applications*  
*Prepreg Shelf Life: 1 month at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
4 hour hold at 93°C (200°F)	TOW, FAB, UD	105°C/221°F	3.30 GPa/480 kpsi	94.4 MPa/13.7 kpsi

### 121°C (250°F) TCR Standard Cure Options

#### UF3376

*Features: High resin elongation, high fiber strength translation in COPV applications, excellent outgas performance*  
*Prepreg Shelf Life: 3 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
4 hour hold at 121°C (250°F)	TOW, FAB	139°C/283°F	3.3 GPa/478 kpsi	97.2 MPa/14.1 kpsi

#### UF3369

*Features: Higher cure resin flow than UF3376, high fiber strength translation in COPV applications, excellent outgas performance*  
*Prepreg Shelf Life: 3 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
4 hour hold at 121°C (250°F)	TOW	117°C/243°F	3.10 GPa/445 kpsi	92.4 MPa/13.4 kpsi

#### TR1111

*Features: High resin toughness (K<sub>IC</sub> 1.475 MPa\*m<sup>1/2</sup>) - a toughened version of UF3369*  
*Prepreg Shelf Life: 3 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
4 hour hold at 121°C (250°F)	TOW, FAB	111°C/232°F	2.30 GPa/333 kpsi	76.5 MPa/11.1 kpsi

1. Alternate cure cycle options are available— See individual resin TDS for additional information on website, or contact the Sales team

2. Roving Tow (TOW), Woven Fabric (FAB), Unidirectional Tape (UD), Braid (BRD)

3. Neat Resin E' Peak Glass Transition DMA value obtained using the TCR standard cure cycle

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# TCR PREPREG RESIN CATALOG



## INTERMEDIATE-TEMPERATURE CURE RESINS

TCR Composites offers epoxy matrix resin systems featuring standard 138°C (280°F) and 154°C (310°F) cure temperatures. Resins with a standard 154°C (310°F) cure cycle are tailorable to cure as low as 270°F (132°C). TCR's intermediate-temperature-cure resins feature a room temperature shelf life of 12 months without refrigeration.

### 138°C (280°F) TCR Standard Cure Options

#### UF3323

*Features: Reduced cure exotherm in thick laminates, ~80% Tg retention under hot-wet conditions, excellent outgas performance*  
*Prepreg Shelf Life: 12 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	Tg <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
24 hour hold at 138°C (280°F)	TOW, FAB, UD, BRD	125°C/257°F	2.83 GPa/410 kpsi	65.5 MPa/9.5 kpsi

### 154°C (310°F) TCR Standard Cure Options

#### UF3352

*Features: Controlled resin flow, optimal for press cure or autoclave cure—a low-tack analog of UF3325 for fabric and UD tape*  
*Prepreg Shelf Life: 12 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	Tg <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
1 hour hold at 154°C (310°F)	FAB, UD	132°C/270°F	2.94 GPa/427 kpsi	76.5 MPa/11.1 kpsi

#### UF3325

*Features: Visually aesthetic cured surface, excellent outgas performance*  
*Prepreg Shelf Life: 12 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	Tg <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
1 hour hold at 154°C (310°F)	TOW, FAB, UD, BRD	129°C/264°F	2.80 GPa/410 kpsi	79.0 MPa/11.5 kpsi

#### UF3330

*Features: Visually aesthetic cured surface, very low tack and high flow resin system*  
*Prepreg Shelf Life: 12 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	Tg <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
1 hour hold at 154°C (310°F)	TOW, BRD	110°C/230°F	2.30 GPa/328 kpsi	60.0 MPa/8.7 kpsi

1. Alternate cure cycle options are available— See individual resin TDS for additional information on website, or contact the Sales team

2. Roving Tow (TOW), Woven Fabric (FAB), Unidirectional Tape (UD), Braid (BRD)

3. Neat Resin E' Peak Glass Transition DMA value obtained using the TCR standard cure cycle

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# TCR PREPREG RESIN CATALOG



## HIGH-TEMPERATURE CURE RESINS

TCR Composites offers epoxy matrix resin systems featuring standard 177°C (350°F) cure temperatures. Several resins with a standard 177°C (350°F) cure cycle are tailorable to cure as low as 310°F (154°C). TCR's high-temperature-cure resins feature room temperature shelf lives ranging from 3-6 months without refrigeration.

### 177°C (350°F) TCR Standard Cure Options

#### UF3360

*Features: Intermediate glass transition temperature, excellent outgas performance  
Prepreg Shelf Life: 6 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
1 hour hold at 177°C (350°F)	TOW, FAB, UD, BRD	166°C/331°F	3.17 GPa/460 kpsi	69.0 MPa/10.0 kpsi

#### UF3362

*Features: Controlled resin flow, optimal for press cure or autoclave cure. A low-tack analog of UF3360 for fabric and UD tape  
Prepreg Shelf Life: 6 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
1 hour hold at 177°C (350°F)	FAB, UD	162°C/324°F	2.86 GPa/415 kpsi	54.0 MPa/7.8 kpsi

#### TR1110

*Features: Intermediate glass transition temperature, flame-retardant—meets UL94 V-1 at 3 mm specimen thickness  
Prepreg Shelf Life: 6 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
1 hour hold at 177°C (350°F)	TOW, FAB	160°C/320°F	4.20 GPa/610 kpsi	53.0 MPa/7.7 kpsi

#### UF3357

*Features: High glass transition temperature  
Prepreg Shelf Life: 6 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
2 hour hold at 177°C (350°F)	TOW	180°C/356°F	3.44 GPa/500 kpsi	41 MPa/6.0 kpsi

#### TR1116

*Features: Snap cure behavior: 2 minute cure time capability, in hot/out hot press cure processing  
Prepreg Shelf Life: 3 months at 24°C (75°F)*

Standard Cure Cycle <sup>1</sup>	Prepreg Products <sup>2</sup>	T <sub>g</sub> <sup>3</sup>	Resin Tensile Modulus	Resin Tensile Strength
2 minute hold at 177°C (350°F)	TOW, FAB	138°C/280°F	3.44 GPa/500 kpsi	75.8 MPa/11 kpsi

1. Alternate cure cycle options are available— See individual resin TDS for additional information on website, or contact the Sales team

2. Roving Tow (TOW), Woven Fabric (FAB), Unidirectional Tape (UD), Braid (BRD)

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