

## Technical Data Sheet

# Evopreg<sup>®</sup> EPC312FR

Flame retardant visual quality epoxy prepregs

### Introduction

Evopreg<sup>®</sup> EPC312FR component prepregs are based on a medium temperature curing, flame retardant, toughened epoxy resin system, formulated specifically for fire retardant performance up to UL94V0, high visual quality and high mechanical properties.

Evopreg<sup>®</sup> EPC312FR can be supplied with a range of reinforcement fibres and fabric constructions. The prepregs can be consolidated by autoclave or press moulding and are designed for a range of applications including automotive, motorsport and general industrial.

### Key Features & Benefits

- Flame retardant up to UL94V0 (laminates thickness 0.7mm and 4.1mm)
- Excellent surface finish
- Cure temperature 120°C
- Service temperature up to 120°C
- Suitable for autoclave and press moulding
- 30 days out-life at room temperature
- 12 months storage life at -18°C
- Good tack and drape
- Toughened
- Available on a wide range of reinforcement fabrics

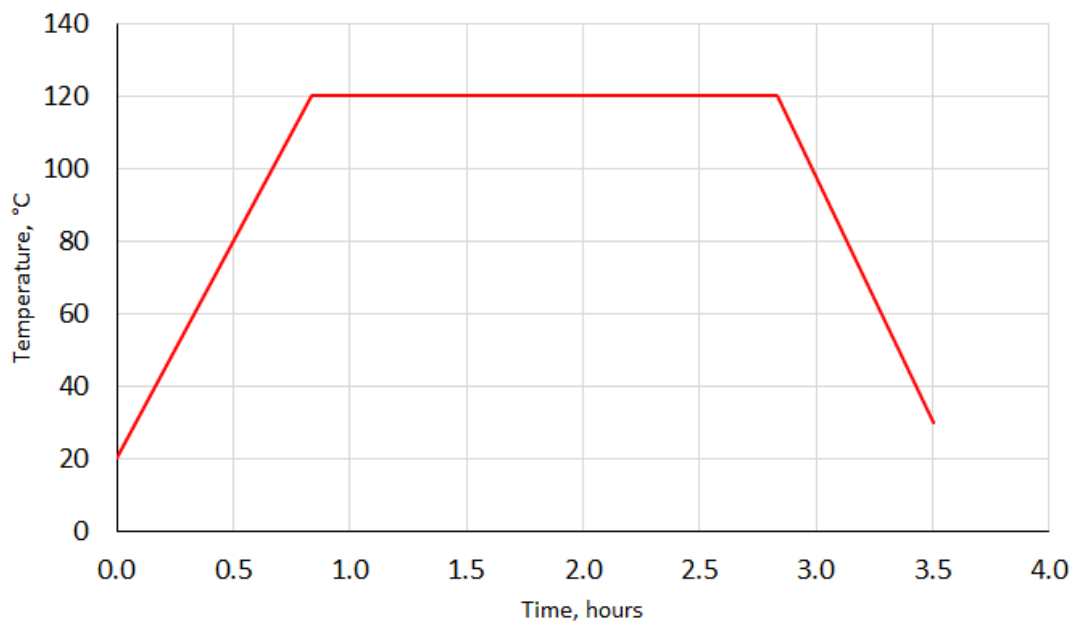
## Processing & Curing

The prepregs can be processed using autoclave and press moulding. Suggested cure cycles are shown below. Out-of-autoclave performance is under evaluation.

Cure temperature	Cure times	Glass transition temperature, T <sub>g</sub>	
		T <sub>g</sub> , onset E'	T <sub>g</sub> , peak tan δ
120°C	2 hours	118 °C	134 °C

- Recommended ramp rate 1-3°C/min
- Minimum cure time 2 hour at 120°C
- Cure times may need to be extended to account for thermal lag in large tools
- T<sub>g</sub> data above for Evopreg® EPC312FR-C205T-HS-3K-45-1250

Suggested cure cycle for standard autoclave cures at 120°C:



Evopreg® EPC312FR can have a slightly lower tack level, especially at temperatures below 20°C. If necessary, to increase tack and workability, apply a small amount of heat such as with a heat gun fitted with a low temperature mode.

# Composite Properties

## Mechanical Properties of Monolithic Laminates

### Carbon

Evopreg® EPC312FR-C205T

Typical data for laminates made from Evopreg® EPC312FR 205g/m<sup>2</sup> 2x2 twill high strength carbon fibre prepreg (Evopreg® EPC312FR-C205T-HS-3K-42-1250) cured in an autoclave for 2 hours at 120°C and 6 bar and left to cool overnight.

Property	Result	Result, normalised	Test method
Fibre content by volume, Vf	44%	47%	-
Flexural strength, 0°	677 MPa	720 MPa	ISO 14125
Flexural modulus, 0°	46.1 GPa	49.0 GPa	ISO 14125
Apparent interlaminar shear strength (ILSS), 0°	67.7 MPa	-	ISO 14130

Evopreg® EPC312FR-C380T

Typical data for laminates made from Evopreg® EPC312FR 380g/m<sup>2</sup> 2x2 twill high strength carbon fibre prepreg (Evopreg® EPC312FR-C380T-HS-12K-40-1250) cured in an autoclave for 2 hours at 120°C and 6 bar and left to cool overnight.

Property	Result	Result, normalised	Test method
Typical fibre content by volume, V <sub>f</sub>	48-52%	50%	-
Density	1.49 g/cm <sup>3</sup>		-
Cured ply thickness	0.43 mm/ply		
Tensile strength, 0°	1110 MPa	1125 MPa	ISO 527-4
Tensile modulus, 0°	59.0 GPa	59.8 GPa	ISO 527-4
Tensile strength, 90°	998 MPa	998 MPa	ISO 527-4
Tensile modulus, 90°	58.0 GPa	58.0 GPa	ISO 527-4
Apparent interlaminar shear strength (ILSS), 0°	64.9 MPa	-	ISO 14130
Apparent interlaminar shear strength (ILSS), 90°	63.4 MPa	-	ISO 14130
Compression strength, 0°	598 MPa	608 MPa	ASTM D6641
Compression strength, 90°	587 MPa	523 MPa	ASTM D6641
Apparent interlaminar shear strength (ILSS), 0°	67.7 MPa	-	ISO 14130
In-plane shear strength, ±45°	73.8	-	ISO 14129 <sup>1</sup>
In-plane shear modulus, ±45°	4.46	-	ISO 14129
Out-of-plane shear (13) strength	57.7 MPa	-	ASTM D5379-19e1
Out-of-plane shear (13) modulus	3.58 GPa	-	ASTM D5379-19e1

1. No clear failure, value taken at 5% strain

## Fire Properties of Monolithic Laminates

### Carbon

#### Evopreg® EPC312FR-C205T

Typical data for laminates made from Evopreg® EPC312FR 205g/m<sup>2</sup> 2x2 twill high strength carbon fibre prepreg (Evopreg® EPC312FR-C205T-HS-3K-42-1250) cured in an autoclave for 2 hours at 120°C and 6 bar and left to cool overnight. Fire testing performed by NADCAP accredited laboratory.

Material	Property	Result	Test method
EPC312FR-C205T-HS-3K-42-1250 0.7mm laminate, 3 ply	Flammability Total burn time 48 h - 23°C ± 2°C and 50% ± 5% HR conditioning.	18s (classification = UL-94V-0)	UL 94 V (2021)
	Flammability Total burn time 168h - 70°C ± 2°C conditioning.	22s (classification = UL-94V-0)	
EPC312FR-C205T-HS-3K-42-1250 1.8mm laminate, 7 ply	Flammability Total burn time 48 h - 23°C ± 2°C and 50% ± 5% HR conditioning.	84s (classification = UL-94V-1)	UL 94 V (2021)
	Flammability Total burn time 168h - 70°C ± 2°C conditioning.	89s (classification = UL-94V-1)	
EPC312FR-C205T-HS-3K-42-1250 4.1 mm laminate, 19 ply	Flammability Total burn time 48 h - 23°C ± 2°C and 50% ± 5% HR conditioning.	0s (classification = UL-94V-0)	UL 94 V (2021)
	Flammability Total burn time 168h - 70°C ± 2°C conditioning.	0s (classification = UL-94V-0)	

## Available Products

Evopreg® preregs are available with a wide range of reinforcements, including woven, non-woven, non-crimp stitched and unidirectional fabrics in the following fibres:

- Carbon
- Glass
- Aramid
- Hybrids
- ampliTex™ Flax (fire performance level to be established)

## Packaging

The material is typically delivered in rolls and with a silicone coated release paper on the bottom and a polythene release film on the top. Typical packaging - 76mm (3") diameter cardboard core, polythene bag, reusable cable ties, cardboard box and end supports. Where relevant, multiple boxes are typically stacked on a standard wooden pallet, strapped and covered with stretch wrap. Other packaging may be available on request. We recommend retaining the boxed packaging to protect the material during storage.

## Storage

The material should ideally be stored in a freezer at -18°C and sealed in a polythene bag. To protect the material, we recommend storing it in its original box with the end supports. To avoid moisture condensation, allow the material to defrost fully and reach room temperature before opening the polythene bag. Typical thaw time for full roll is 4-6 hours. Keep the material sealed in the polythene bag when not in use to prevent moisture absorption. The cable tie that seals the polythene bag is reusable. Out-life at room temperature is 30 days. Storage life at -18°C is 12 months.

## Health & Safety

Please refer to the Safety Data Sheet (SDS) before use. This material contains epoxy resin and fibres which can cause irritation to skin and eyes and allergic reactions. Wear appropriate PPE including overalls and impervious gloves, and ensure adequate ventilation. Exothermic reactions can occur when curing epoxy resins, and particular care must be taken when curing thick laminates.

## Disclaimer

The information provided here is believed to be accurate but should be considered indicative only. It is the responsibility of the customer to check the suitability of the product for their specific application prior to use.

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