

Technical Data Sheet

Evopreg[®] EPC210

Flexible cure epoxy component prepregs with higher service temperature

Introduction

Evopreg[®] EPC210 component prepregs are primarily designed for medium temperature autoclave or out-of-autoclave processing. Their flexible cure profile also makes them ideally suited to rapid press cure at higher temperatures.

Based on a toughened epoxy resin system, Evopreg[®] EPC210 is formulated specifically for high performance, ease of lay-up, excellent surface finish and a service temperature of up to 160 °C. It is supplied as standard with black pigmentation.

The prepregs can be supplied with a range of reinforcement fibres and fabric constructions. They require low pressure autoclave processing for optimum surface finish and are suitable for a range of applications including automotive, motorsport, sporting goods and general industrial.

Key Features & Benefits

- Autoclave, vacuum bag/oven or press cure
- Service temperature up to 160 °C
- 21 days out-life at room temperature
- 12 months storage life at -18 °C
- Good tack and drape
- Toughened
- Excellent surface finish
- Available on a range of reinforcement fabrics

Processing & Curing

The preregs can be processed using standard techniques including vacuum bag/oven and autoclave on epoxy composite tooling, metallic tooling or PTFE surfaces. Suggested cure cycles are shown below.

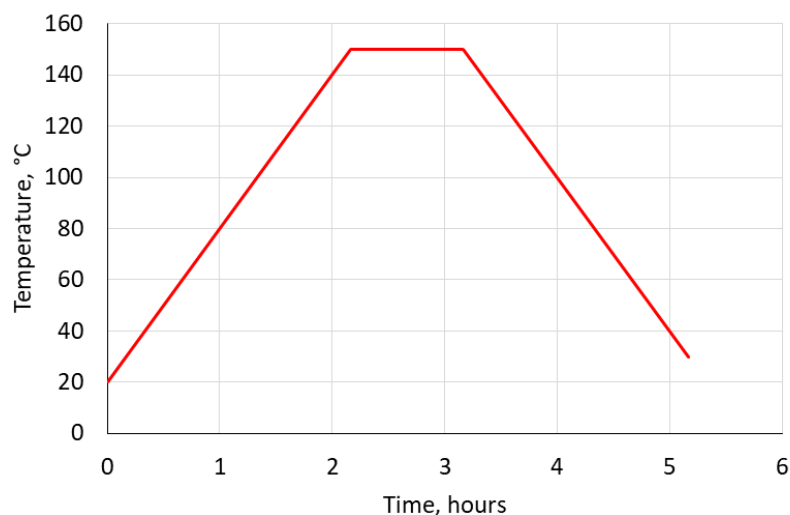
Cycled Cure (Autoclave or Oven)

Cure temperature	Minimum cure time	Glass transition temperature, Tg	
		Tg, onset E'	Tg, peak tan δ
130 °C	1 hour	142 °C	181 °C
150 °C (recommended)	1 hour*	157 °C	179 °C

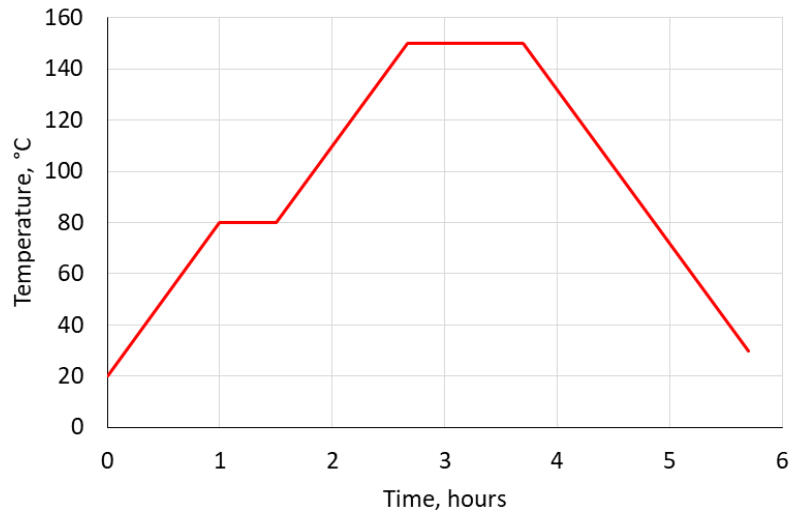
*This can be reduced if tool lag is insignificant

- Recommended maximum ramp rate 1°C/min.
- Ramp rates may need to be reduced and/or cure times extended to account for thermal lag in large tools.
- For autoclave cures, we recommend using a relatively low pressure e.g. 30-50 psi (2-3.5 bar) to avoid excessive resin bleed.
- If curing out-of-autoclave, an initial hold at 80°C for at least 30 minutes before ramping to higher temperatures may assist resin flow and improve surface finish.
- Lower temperature initial cures may also be possible, followed by a free standing post-cure. Please contact us for more information.

Suggested autoclave cure schedule (ramp rate 1 °C/min, dwell 1 hour at 150 °C):



Suggested out-of-autoclave oven cure schedule (ramp rate 1 °C/min, dwell 30 minutes at 80 °C and 1 hour at 150 °C):



Press Cure (Hot-in, Hot-Out)

Evopreg® EPC210 prepregs can be press cured hot-in, hot-out. Suggested conditions are given in the table below. Actual timings will depend on the equipment and tooling used and may need to be determined experimentally. It may be necessary to set the platen temperatures higher in order to achieve these temperatures at the tool surface within a reasonable timeframe.

Cure temperature	Pressure	Minimum cure time	Glass transition temperature, Tg	
			Tg, onset E'	Tg, peak tan δ
130 °C	3.5 bar	20 minutes	167 °C	182 °C
140 °C	3.5 bar	10 minutes	169 °C	181 °C
150 °C	3.5 bar	5 minutes	157 °C	175 °C

The material has been tested using this processing method in thicknesses up to 2.5 mm. Exotherms may be possible in thicker sections. Please contact us for advice.

Composite Properties

Mechanical Properties of Monolithic Laminates

Carbon

EPC210-C205T - Vacuum Bag/Oven Cure

Typical data for laminates made from Evopreg® EPC210 205 g/m² 2x2 twill high strength carbon fibre prepreg (Evopreg® EPC210-C205T-HS-3K-45-1250) cured in a vacuum bag/oven for 1 hour at 150°C including an intermediate dwell 30 minutes at 80 °C.

Property	Result	Result, normalized 50% Vf	Test method
Fibre content by volume, Vf	44%	50%	-
Density	1.47 g/cm ³	-	-
Cured ply thickness	0.25 mm/ply	-	-
Flexural strength, 0°	738 MPa	833 MPa	ISO 14125
Flexural modulus, 0°	49.6 GPa	55.9 GPa	ISO 14125
Tensile strength, 0°	567 MPa	644 MPa	ISO 527-4
Tensile modulus, 0°	54.4 GPa	61.8 GPa	ISO 527-4
Compression strength, 0°	601 MPa	683 MPa	ASTM D6641
Apparent interlaminar shear strength (ILSS), 0°	70.7 MPa	-	ISO 14130
In-plane shear strength, ±45°	84 MPa* (101 MPa **)	-	ISO 14129

* at 5% strain, ** at break

EPC210-C205T - Hot-in Hot-out Press Cure

Typical data for laminates made from Evopreg® EPC210 205 g/m² 2x2 twill high strength carbon fibre prepreg (Evopreg® EPC210-C205T-HS-3K-45-1250) hot press cured for 5 minutes at 150 °C.

Property	Result	Result, normalized 50% Vf	Test method
Fibre content by volume, Vf	51%	50%	-
Density	1.52 g/cm ³	-	-
Cured ply thickness	0.21 mm/ply	-	-
Flexural strength, 0°	905 MPa	874 MPa	ISO 14125
Flexural modulus, 0°	57.2 GPa	55.2 GPa	ISO 14125

EPC210-G300S - Hot-in Hot-out Press Cure

Typical data for laminates made from Evopreg® EPC210 300g/m² 8HS 7781 style glass fibre prepreg (Evopreg® EPC210-G300S-7781-38-1270) hot press cured for 5 minutes at 150 °C.

Property	Result	Result, normalized 50% Vf	Test method
Fibre content by volume, Vf	56-60%	50%	-
Density	1.99 g/cm ³	-	-
Cured ply thickness	0.20 mm/ply	-	-
Flexural strength, 0°	816 MPa	674 MPa	ISO 14125
Flexural modulus, 0°	31.6 GPa	26.1 GPa	ISO 14125
Tensile strength, 0°	524 MPa	469 MPa	ISO 527-4
Tensile modulus, 0°	32.0 GPa	28.5 GPa	ISO 527-4
Apparent interlaminar shear strength (ILSS), 0°	67.2 MPa	-	ISO 14130

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
- ampliTex™ Flax
- Aramid
- Hybrids

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 - 76 mm (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 a full roll is 4-6 hours. Keep the material sealed in a polythene bag when not in use to prevent moisture absorption. Out-life at room temperature is 21 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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