



XC110 prepreg is laid into a temperature stable mould. This part uses only 2 plies in total.



Once laminated, the part is vacuum bagged and cured in an oven at 120°C under vacuum.



The cured part has a pin-hole free 'class A' surface finish straight from the mould.

## XC110 | OUT-OF-AUTOCLAVE COMPONENT PREPREG SYSTEM

XPREG® XC110 is an advanced prepreg system designed specifically for out-of-autoclave (vacuum bag, oven cure) processing. The special resin formulation has been developed to produce cured laminates with a 'class A' surface finish and minimal void content when oven-cured under vacuum pressure only (under optimum conditions, see below).

Components made using the XC110 resin system offer mechanical properties comparable to autoclave-cure systems (such as XPREG® XC130) without the need for expensive autoclave plant or the associated cycle costs. The system is also ideally suited for large components which exceed the capacity of typical autoclaves, such as boat hulls and turbine blades.

XC110 prepregs can be backed-up with unidirectional reinforcement (from the XC130 range) and are fully compatible with our XA120 adhesive film meaning that even the most complex composite structures - including honeycomb cores - can be achieved out-of-autoclave.

## RECOMMENDED USES

XC110 is the recommended system for both structural and cosmetic applications where components will be cured without an autoclave.

The combination of excellent mechanical performance, visual quality appearance and class-A surface finish make XC110 prepregs suitable for a wide range of applications from large-scale structural components to high-precision cosmetic parts.

### High Performance

- UAV/drones
- Motorsport
- Bike frames
- Racing boats
- Skis, boards

### Large Scale

- Boat hulls
- Wind energy
- Mass transit
- Light aircraft

### Cosmetic/Lifestyle

- Interior trim
- Phone cases
- Furniture
- Stands/display

## CURING

XPREG® XC110 is designed to be oven cured in a vacuum bag at full vacuum pressure however it can also be cured in an autoclave or hot-press. Minimum vacuum pressure is 10mbar.

For best results, an accurately controlled multi-stage temperature cycle with final cure temperature of 120°C should be followed:

### STANDARD CURE CYCLE

Step	Start Temp	Ramp Rate	Duration	End Temp	Elapsed Time
1	~ 20°C	1°C /min	00:50	70°C	00:50
2	70°C	Soak	04:00	70°C	04:50
3	70°C	2°C /min	00:25	120°C	05:15
4	120°C	Soak	01:00	120°C	06:15
5	120°C	Natural Cool	--	~20°C	07:15



For detailed information, including alternative cure cycles from 85°C see the XC110 Processing Handbook.

## SUITABLE MOULDS/TOOLING

Moulds/tools should be epoxy-based composite moulds, epoxy tooling board or metal. In all cases, moulds must be temperature stable to a minimum of 85°C but ideally to 120°C.

Although it is possible to use Vinylester tools (such as Uni-Mould™) they are not recommended due to the increased possibility of surface imperfections (pin holes) which can occur when XPREG® XC110 is cured in the presence of vinylester.

Polyurethane tooling board should never be used with any XPREG® prepreg due to the cure inhibition of polyurethane on epoxy on elevated temperature.

### Fully Compatible

- Carbon or glass fibre prepreg moulds (e.g. XPREG® XT135)
- Epoxy tooling board (e.g. EP700 with S120 Board Sealer)
- High temp epoxy hand-layup moulds (e.g. EG160 / EMP160)
- Aluminium / stainless steel moulds
- Toughened glass (for flat sheet/panels)

### NOT Recommended

- Vinylester composite moulds (e.g. Uni-Mould™)

### NOT Compatible

- Polyester composite moulds
- Polyurethane model/tooling board

For detailed information on mould suitability and preparation, see the *XC110 Processing Handbook*.

## OPTIMUM CURE CONDITIONS

XPREG® XC110 is designed to be oven cured in a vacuum bag at full vacuum pressure, without the need for an autoclave. Used in this way, it can produce parts with a pinhole-free surface finish, under optimum conditions.

The quality of surface finish that can be achieved is determined by several factors, including laminate thickness, bagging technique, vacuum level and cure cycle. For the best chance of a pin-hole free surface finish, ensure:

- Tooling is compatible
- Ply stack does not exceed ~1000gsm total\*
- Bag is perfectly sealed, vacuum level is 10mbar or better
- Vacuum consumable stack is as recommended
- Multi-stage cure cycle, with final cure temperature of 120°C, is accurately followed

\*It is possible to produce thicker laminates, however increasing this above 1000gsm does restrict the ability for the stack to breathe and allow any trapped air on the surface to escape. For laminates above this then, it is likely that pinhole will start to appear on the surface of the part, this doesn't effect the structural performance but may be considered a cosmetic blemish.

## STANDARD REINFORCEMENTS

XPREG® XC110 is available off-the-shelf using standard reinforcements of 210g 3k and 416g 12k carbon fibre.

SKU	Fibre	Weight (gsm)	Weave	Width (mm)
XC110-C331T2-210(1250)	Pyrofil TR30S High Strength Carbon 3k	210	2x2	1250
XC110-1232T2-416(1250)	Pyrofil TR50S High Strength Carbon 12k	416	2x2	1250

A range of alternative reinforcements including multiaxial and unidirectional can be produced on request, subject to MOQ.

## TECHNICAL SPECIFICATION

### GENERAL PROPERTIES

Cure temperature range	85°C to 120°C
Maximum service temperature	115°C (after post cure)
Out-life (at 20°C)	30 days
Freezer-life (at -18 °C)	12 months
VOC content	Very low (solvent free)

### CURED MECHANICAL PROPERTIES

Tests performed on XC110-C331T2-210(1250) laminate cured out-of-autoclave

Property	Test Standard	Units	Result
Compressive strength	BS EN ISO 14126 : 1999	MPa	483
Tensile strength	BS EN ISO 527-4 : 1997	MPa	521
Tensile modulus	BS EN ISO 527-4 : 1997	GPa	55.1
Flexural strength	BS EN ISO 14125 : 1998	MPa	777
Flexural modulus	BS EN ISO 14125 : 1998	GPa	46.7
Interlaminar shear strength	BS EN 2563 : 1997	MPa	64.7
Tg Onset (DMA)	ASTM 1-0003 Issue 3	°C	121
Tg Peak (DMA)	ASTM 1-0003 Issue 3	°C	135

## STORAGE & HANDLING

When not in use, XPREG® prepregs should be kept frozen at -18°C (0°F) in sealed plastic packaging. When ready to use, the material should be removed from the freezer and allowed to thaw fully to room temperature before being removed from the packaging.

Remaining material should be re-sealed before returning to the freezer to avoid the risk of moisture uptake.

## PROCESSING GUIDE

XPREG® XC110 is supported by a highly detailed processing guide to help users achieve the best results from this advanced material.

The guide includes information on recommended laminating and vacuum bagging procedures, tooling and mould preparation, process specific cure cycles, working with core materials and adhesive films, and troubleshooting tips.

## SAFETY INFORMATION

This material contains uncured epoxy resin which can cause allergic reactions with skin contact. Repeated and prolonged skin contact must be avoided.

Please refer to the product safety data sheet before working with this material.

## OTHER XPREG® SYSTEMS

<b>XT135</b>	Out-of-autoclave tooling prepreg system ideal for use with XC110. Maximum service temp of 135°C.
<b>XA120</b>	Adhesive film fully compatible with XC110.
<b>XC130</b>	Autoclave cure, visual quality, high performance prepreg with a service temperature of 130°C. Co-curable with XC110.
<b>XT180</b>	Autoclave cure tooling prepreg with low CTE, long out-life and 180°C service temperature.
<b>XT210</b>	Aerospace industry autoclave cure tooling prepreg with low CTE and very high 210°C service temperature.

## Disclaimer

This data is not to be used for specifications. Values listed are for typical properties and should not be considered minimum or maximum.

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