

Epoxy Bonding Polyester Gelcoats Designed to Bond to Epoxy Resin Systems



LDC Racing Sailboat
manufactured by
Synthesize Yachts and Design
using Crystic GC 252PA

Customer Experiences

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We have been using Crystic GC 252PA for a number of years to manufacture racing sailboats as it is the only polyester gelcoat on the market that bonds to an epoxy resin. It's been used on many boats without any adhesion problems in tough conditions. We can de-mould very quickly so have cut down dramatically on processing time. It's much easier to apply than epoxy gelcoats and repairs can be done in a fraction of the time. We are very happy to recommend this product.

Jamie Stewart - Synthesize Yachts & Design

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Crystic GC 252PA is extensively used by Premier Composites with an epoxy resin system, as it is extremely compatible. The main application is for invalid ramps within the transport sector. It is Premier's preferred gelcoat because it is easy to apply, has rapid cure and is well suited to our production processes. We have been using it for over 5 years now, and are happy to have a reliable, cost effective product that does not suffer from batch to batch variation.

Richard Wild - Premier Composites

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Crystic® Epoxy Bonding Gelcoats

A unique range of polyester gelcoats with exceptional adhesion to epoxy substrates allowing them to be used instead of an epoxy gelcoat. These gelcoats have been used successfully by moulders who find the product range offers excellent performance in demanding epoxy applications whilst retaining the ease of use of polyesters. This means customers enjoy huge savings on de-mould time and repairs over epoxy gelcoats, in addition to paying a lower unit price.

Markets

- ✓ WIND ENERGY*
- ✓ MARINE*
- ✓ BUILDING*
- ✓ INDUSTRIAL*
- ✓ TRANSPORT*

* Not for use in applications where parts are permanently immersed in water. Also not recommended for epoxy pre-pregs. For more information please contact the Scott Bader technical service department.

Product Range

Crystic GC 251PA	Designed for brush application, includes a styrene suppressant to give exceptionally low styrene emission in use	Thix	9	1.1	44	68	66	4.0	2.1
Crystic GC 252PA	Standard grade designed for brush application	Thix	9	1.1	51	71	65	4.3	2.2
Crystic GC 253PA	Standard grade designed for spray application	Thix	9	1.1	42	76	67	3.9	2.2
Crystic GC 255PA	Fire retardant brush gelcoat for use with epoxy laminating systems	Thix	8	1.4	52	78	57	5.4	1.7

Note 1: Cure schedule for mechanical data is 24 hours at 20°C, 3 hours at 80°C

Note 2: †Cure schedule for HDT is 24 hours at 20°C, 5 hours at 80°C, 3 hours at 120°C

Note 3: *Cure schedule for geltime is 2% Butanox® M50 at 25°C. Butanox is a registered trademark of Akzo Nobel.

Why Choose Crystic® Epoxy Bonding Polyester Gelcoats Instead of Epoxy Gelcoat?

Ease of Use and Time/Cost Savings

- No back surface preparation necessary to achieve exceptional adhesion.
- No tiecoat required.
- Polyester gelcoats can be backed-up rapidly meaning **de-mould times are significantly shorter** resulting in huge productivity gains.
- Polyester gelcoat **repairs are quicker and easier** saving considerable time and money.
- **Exceptionally easy handling** - simply add 2%MEKP catalyst and spray or brush apply.
- **Sag resistant** - at recommended thickness of 0.4mm - 0.8mm

Unique Product Benefits

- **Significantly better UV resistance** - natural Florida 12-month weathering testing has shown excellent gloss retention and low colour change.
- **Cures at ambient temperature** - heated moulds not required, although cure at 30 - 35°C will reduce back up delay.
- **Supplied in any RAL or colour-matched colour.**
- **Optimum overcoating (back-up time) is 2 hours** - maximum is 24 hours.
- High Tg demonstrates ability to **withstand higher operating temperatures.**
- **Robust, reliable bond** - With both epoxy laminating and infusion systems and a number of wet lay epoxy systems. Not recommended for epoxy pre-pregs

Operating Performance

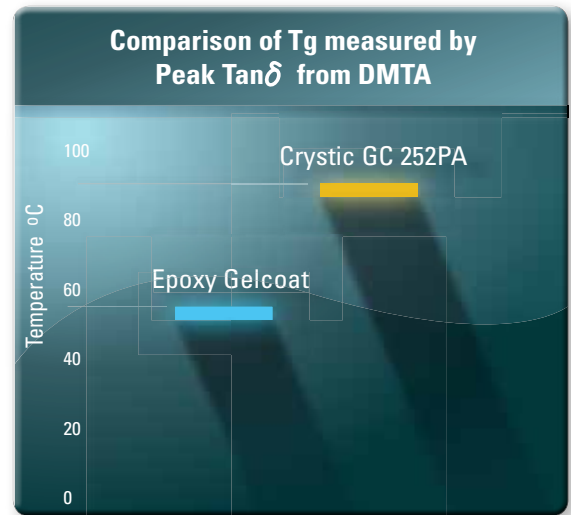
The higher T_g demonstrated by Crystic GC 252PA means it can withstand higher operating temperatures than the epoxy gelcoat.

Note 1: GC 252PA curing schedule of 16 hours at 40°C

Note 2: Epoxy Gelcoat curing schedule of 28 days at 21°C

Mechanical Performance

When Crystic Epoxy Bonding Gelcoats are used for the production of a typical laminate, the finished structure retains the excellent mechanical properties associated with epoxy systems. Values are similar across the Crystic Epoxy Bonding Gelcoat range.



Gelcoat	Back Up Delay Time	Tensile Strain to Failure		Flexural Properties		
		First GC Crack %	Strain To Laminate Failure %	Flexural Strength (MPa)	Flexural Modulus (MPa)	GC Strain To Failure %
Crystic GC 252PA	2 hours	1.6	6.5	152	6060	2.7
Crystic GC 252PA	24 hours	2.2	6.7	159	6365	2.6
Epoxy	6 hours	2.0	7.1	109	5340	2.3

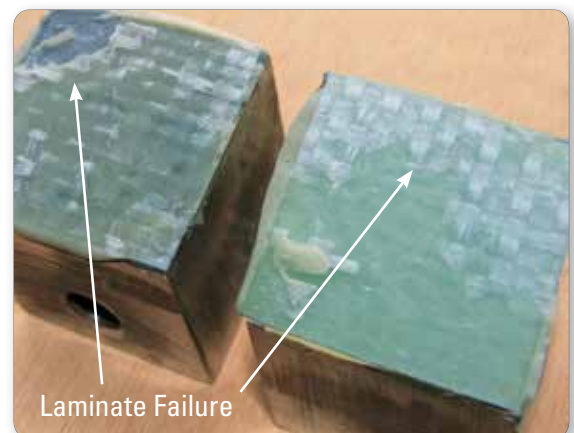
Adhesion Testing

Rigorous testing for adhesion to a number of different epoxy backing systems has been carried out. The results match a complete epoxy system. Similar results are seen across the Crystic Epoxy Bonding Gelcoat range.

Gelcoat	Back Up Delay Time	Z-direction Strength (MPa)
Crystic GC 252PA	2 hours	19.7
Crystic GC 252PA	24 hours	19.4
Epoxy	6 hours	19.9

Note 1: Values for Crystic GC 252PA used as an example. Other gelcoats in this range show similar properties.

Note 2: Results based on laminates produced with liquid epoxy backing system cured for 16 hours at 50°C.



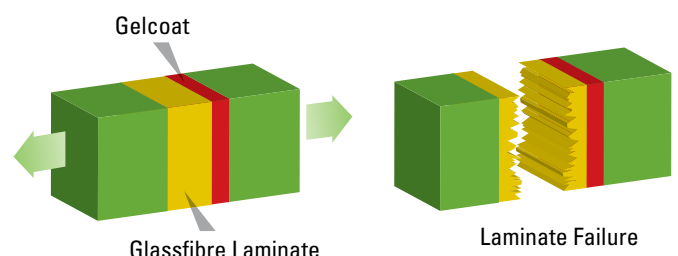
Result of GC 252PA adhesion test showing that failure is internal within the laminate

If 251PA, 252PA, 253PA or 255PA is used as a gelcoat with polyester laminating systems, then adhesion failure is likely to occur. Similarly, if the product is "double-gelled", then this is also likely to lead to adhesion failure. For these reasons, neither of these procedures is recommended.

It is recommended that customers test the gelcoat before use under their own conditions of application to ensure the required surface finish and adhesion is achieved.

Z-Direction Testing

The Z-Direction test completed on Crystic GC 252PA showed laminate failure, see image above. This proves that Crystic GC 252PA bonds effectively to epoxy substrates as the gelcoat adhesion to the epoxy laminate did not fail. Same laminate failure mode is achieved across the Crystic Epoxy Bonding Gelcoat range.



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