

Composite Marine Range for FRP Tooling and Boat Construction



Excellence You Can Trust

Scott Bader has been the undisputed expert in Marine resin and gelcoat technology for nearly 60 years. It pioneered the use of fibre reinforced plastic (FRP) in the marine industry and a Scott Bader resin was used in the first ever composite boat – the Tod 12 Dinghy.

Scott Bader has been leading the field of marine composites through an endless drive for future innovations. The Crystic® product range has been widely used by the world's leading boat builders. Crystic® products have a reputation not only for creating exceptional aesthetics and producing unmatched performance, but also for providing long term protection from weathering. Scott Bader also has an industry-leading technical support service available.

Achieving Environmental Standards

To avoid legislative action, it is important to ensure that manufacturing operations meet the latest emission standards. Achieving these standards also creates a better working environment for employees.

Scott Bader was again ahead of its time, when it introduced a low styrene emission resin over 30 years ago. Scott Bader also now promotes a whole range of products and processes that reduce the environmental impact of composites, including closed mould systems which virtually eliminate polluting emissions and the innovative application of Crystic® Crestomer structural adhesives in bulkheads.

Working Partnerships

Scott Bader is a Commonwealth company. It is not owned by shareholders, the employees own the company. It cannot be taken over or be forced to merge with other companies. This means that customers are confident that Scott Bader can provide long term working partnerships designing and supplying the products they need for years to come.



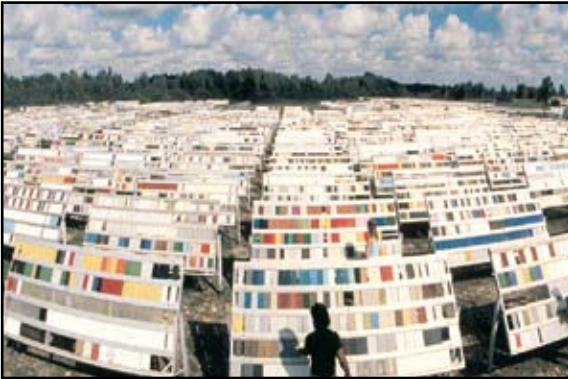
Satisfying Your Needs

Scott Bader has specifically designed a wide range of marine products to match the varying needs of your customers. The remainder of the brochure describes the solutions you are looking for.

Quality Assured

Scott Bader's rigorous development programme ensures that all new gelcoats are tested under the most extreme conditions, including external weathering using EMMAQUA® in the Arizona desert and 12 months continuous exposure in Florida.

In addition, when each batch of gelcoat is manufactured at Scott Bader, it has to pass stringent Q.C tests to ensure consistent quality, colour, surface finish and handling.



Extreme natural exposure conditions accelerate product weathering, two to three times faster than normal locations.

Customer Experiences

"Hi Spec Plastics have been in business since 1968 designing and manufacturing liferaft containers. Over the years we have tried and tested a number of different tooling gelcoats but none have exhibited the performance excellence of Crystic 14PA. One of the moulds produced using 14PA has had over 4,000 lifts over a number of years with no evidence of dulling, crazing or cracking of the gelcoat surface. Crystic 14PA has exceeded all our expectations for a tooling gelcoat and we strongly suggest you try it."

*Gary Bates -
Managing Director, Hi Spec Plastics.*



High gloss, water mark free moulding coming off a mould made by Hi Spec using Red 5201 Crystic® 14PA tooling gelcoat.

"We have been working with Scott Bader for many years and are extremely happy with the level of service we receive. Scott Bader has the best products on the market for the marine industry which in turn helps us ensure our products are of the highest quality".

*John Rudge -
Purchasing Manager, Fairline Boats.*

"Scott Bader's unique, innovative products have allowed us to keep our competitive edge. We have been able to make valuable savings both in time and labour costs, without compromising on quality."

Chris Gates, Operations Director, Princess Yachts

"Scott Bader has been supplying Chantier AMEL for 20 years. The technical service and the quality of products meet our requirements to our utmost satisfaction."

*Monsieur Jacky MALEIX
Production Manager, Chantier AMEL*

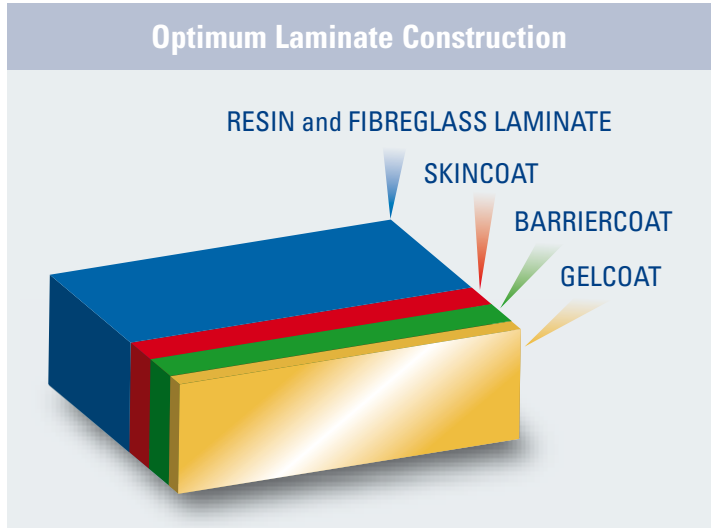
What could we do for you?

Crystic Matched Performance Systems

Provide Ultimate Aesthetics and Blistering Resistance

Over 30 years ago Scott Bader designed the concept of chemically matching the performance of products to work synergistically and successfully tackle the phenomenon of osmosis, or blistering. After decades of commercial use, the benefits of using Crystic® Matched Performance Systems have been shown to extend beyond eliminating blistering and creating exceptional aesthetics. You can also expect:-

- improved strength and rigidity
- greater strength to weight ratios
- better fuel economy and performance
- superior water resistance



	Gelcoat	Barriercoat	Skincoat	Resin
SPRAY APPLICATION	LS 30PA	Crestacoat® 5000PA	VE679PA	LS 451PA
	LS 97PA		489PA	2.420PA
HAND LAY-UP	LS 31PA	Crestacoat® 5000PA	VE679PA	2.406PA
	LS 88PA		489PA	2.446PA
CLOSED MOULD	LS 30PA	Crestacoat® 5000PA	VE679PA	701PA
	LS 31PA		489PA	702PA
	LS 97PA			703PA
	LS 88PA		VE676-03	
				VE679-03PA

Crystic Product Range

In addition to the Matched Performance Systems, Scott Bader has an extensive gelcoat, resin and pigment paste range not covered in this brochure. Please ask your local Scott Bader contact for more details.

Matched Performance Range Overview

Gelcoats		Viscosity (Poise)	Geltime* (Mins)	Tensile Strength (MPa)	Tensile Modulus (GPa)	Elongation at break (%)	Approvals
LS 30PA	The ultimate u.v. resistant Iso/NPG spray gelcoat with superb gloss retention, water resistance and toughness.	Thix.	9	52	3.4	2.8	Lloyds
LS 31PA	The ultimate u.v. resistant Iso/NPG brush gelcoat with superb gloss retention, water resistance and toughness.	Thix.	9	52	3.4	2.8	Lloyds
LS 97PA	An exceptional isophthalic spray gelcoat with excellent u.v. resistance, gloss retention and water resistance.	Thix.	7	51	3.8	2.0	Lloyds
LS 88PA	An exceptional isophthalic brush gelcoat with excellent u.v. resistance, gloss retention and water resistance.	Thix.	8	60	3.85	2.3	Lloyds

Barriercoat		Viscosity (Poise)	Geltime* (Mins)	Tensile Strength (MPa)	Tensile Modulus (GPa)	Elongation at break (%)	Approvals
Crestacoat 5000PA	The ultimate barriercoat for industry-leading surface aesthetics.	Thix.	25	17	1.1	3.5	-

Skincoats		Viscosity (Poise)	Geltime* (Mins)	Tensile Strength (MPa)	Tensile Modulus (GPa)	Elongation at break (%)	Approvals
VE679PA	Vinyl ester / DCPD skincoat giving optimum aesthetics and osmosis resistance.	Thix.	23	52	3.0	2.1	Lloyds
489PA	Isophthalic skincoat with excellent durability and blister resistance.	Thix.	12	76	3.5	4.0	Lloyds and DNV

Resins		Viscosity (Poise)	Geltime* (Mins)	Tensile Strength (MPa)	Tensile Modulus (GPa)	Elongation at break (%)	Approvals
LS 451PA	High performance low styrene DCPD modified resin to create an enhanced surface finish.	Thix.	20	46	2.7	2.5	Lloyds
2.420PA	Orthophthalic resin with low styrene emission, low exotherm and long geltime.	Thix.	63	44	3.7	1.3	Lloyds
2.406PA	Orthophthalic resin with low styrene emission, low exotherm and rapid wet out.	Thix.	11	54	3.7	1.7	Lloyds
2.446PA	Orthophthalic resin with low styrene emission, rapid wet out and fast hardening ideal for rapid mould turnaround.	Thix.	25	50	3.8	1.5	Lloyds and DNV
701PA	Closed mould isophthalic resin with low viscosity and controlled exotherm characteristics.	1.6	59	66	3.6	2.5	Lloyds
702PA	Closed mould orthophthalic resin with low viscosity and controlled exotherm characteristics.	1.6	40	44	3.9	1.2	Lloyds
703PA	Closed mould DCPD resin with low viscosity and controlled exotherm characteristics.	1.6	64	38	3.1	1.3	Lloyds
VE676-03	Closed mould non-accelerated and non-thixotropic epoxy bisphenol vinyl ester resin.	1.75	110	75	3.4	4.0	Lloyds
VE679-03PA	Pre-accelerated, non-thixotropic VE/DCPD resin for vacuum infusion.	1.85	60	64	3.3	2.3	-

* A variety of cure systems were used. Please see individual product datasheets for more information.

Crystic Crestomer Structural Adhesives

Crystic Crestomer® structural adhesives were formulated specifically for the Fibre Reinforced Plastics (FRP) industry. They are based on Scott Bader's unique urethane acrylate technology and they exhibit exceptional impact strength, flexibility and toughness.

The Crystic Crestomer® pedigree was established over 25 years ago. The first commercial application for Crystic Crestomer® adhesive was in the manufacture of minehunters. The unique properties of Crystic Crestomer® ensured peel and crack resistance was significantly improved. Crystic Crestomer® is the only successful material specifically designed to meet this demanding application.

Product Range Overview

Crystic Crestomer® structural adhesives are available with a range of curing schedules to suit a variety of applications.

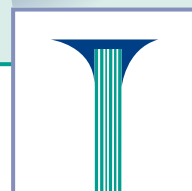
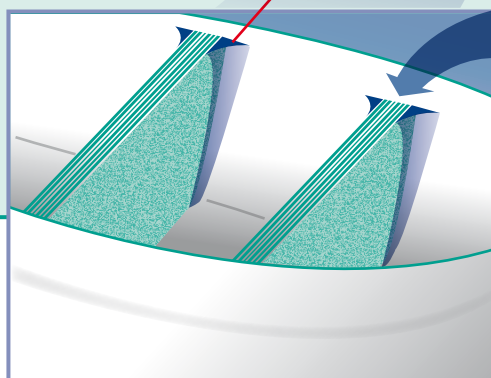
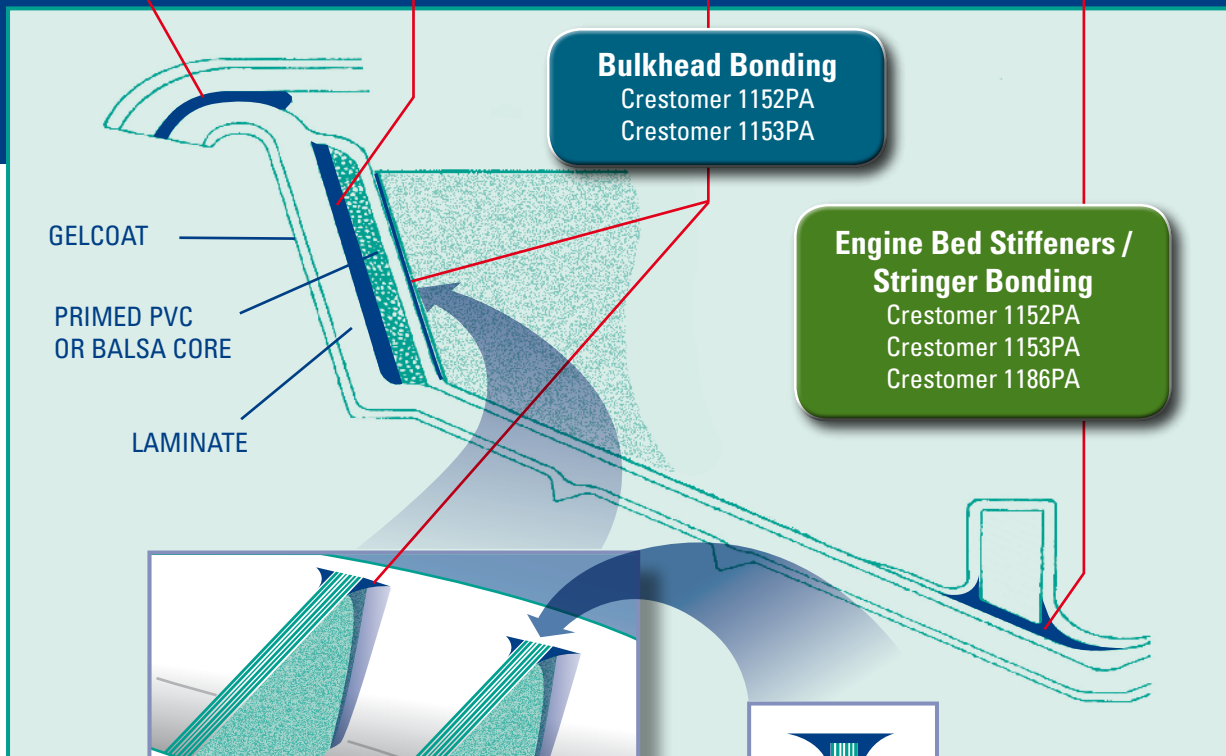
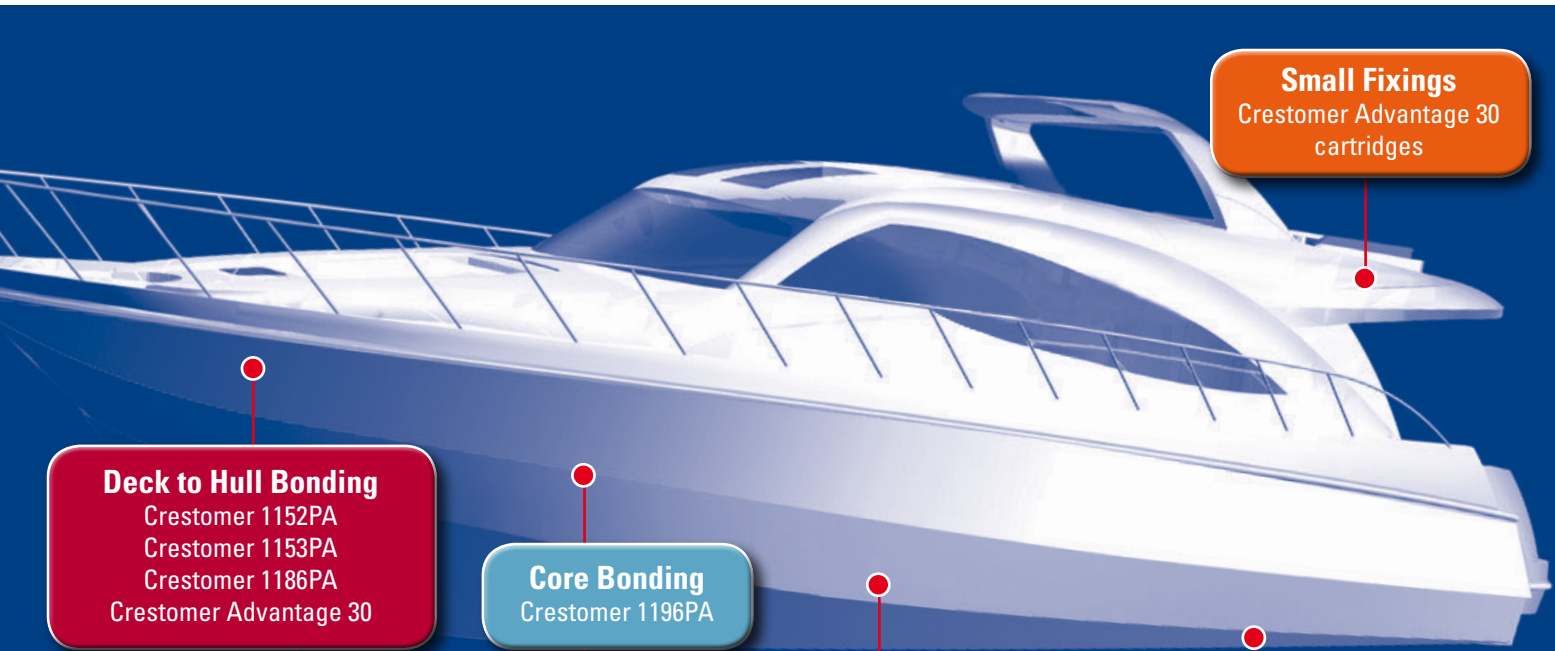
Crystic Crestomer Product	Description	Approvals	Appearance	*Gel Time (mins)	Tensile Strength (MPa)	Tensile Modulus (MPa)	Elongation at Break (%)	Performance Characteristics
1152PA	High Performance Structural Adhesive	Lloyds Acceptance DNV RINA	Mauve Gel	*50	26	1400	100	Structural adhesive for demanding applications
1153PA	High Performance Structural Adhesive with longer open time	Lloyds Acceptance	Mauve Gel	*90	26	1400	100	Structural adhesive for demanding applications / larger components
1186PA	Multi Purpose Structural Adhesive	Lloyds Acceptance	Grey Paste	*50	14	800	6	High strength gap filling adhesive
1196PA	Structural Core bonding Adhesive	Lloyds Acceptance DNV RINA	Pink Paste	*50	20	1300	4	Low density adhesive specifically developed for demanding core bonding applications
1151A	Advantage Adhesive For Bulk Application Amine Accelerated	Lloyds Acceptance RINA	Green / Yellow Gel	**25	22	500	>100	Structural adhesive for demanding applications
Advantage 30	High Performance Structural Adhesive pre-packed in cartridges	Lloyds Acceptance DNV RINA	White Paste	30	15	340	>85	High performance structural adhesive for convenience and flexibility

*2% Butanox® M-50 at 25°C **2% Perkadox® BT-50 at 25°C

Crestomers In Action

Today, Crystic Crestomer® structural adhesives are used throughout the marine industry, where customers appreciate the enormous benefits associated with:

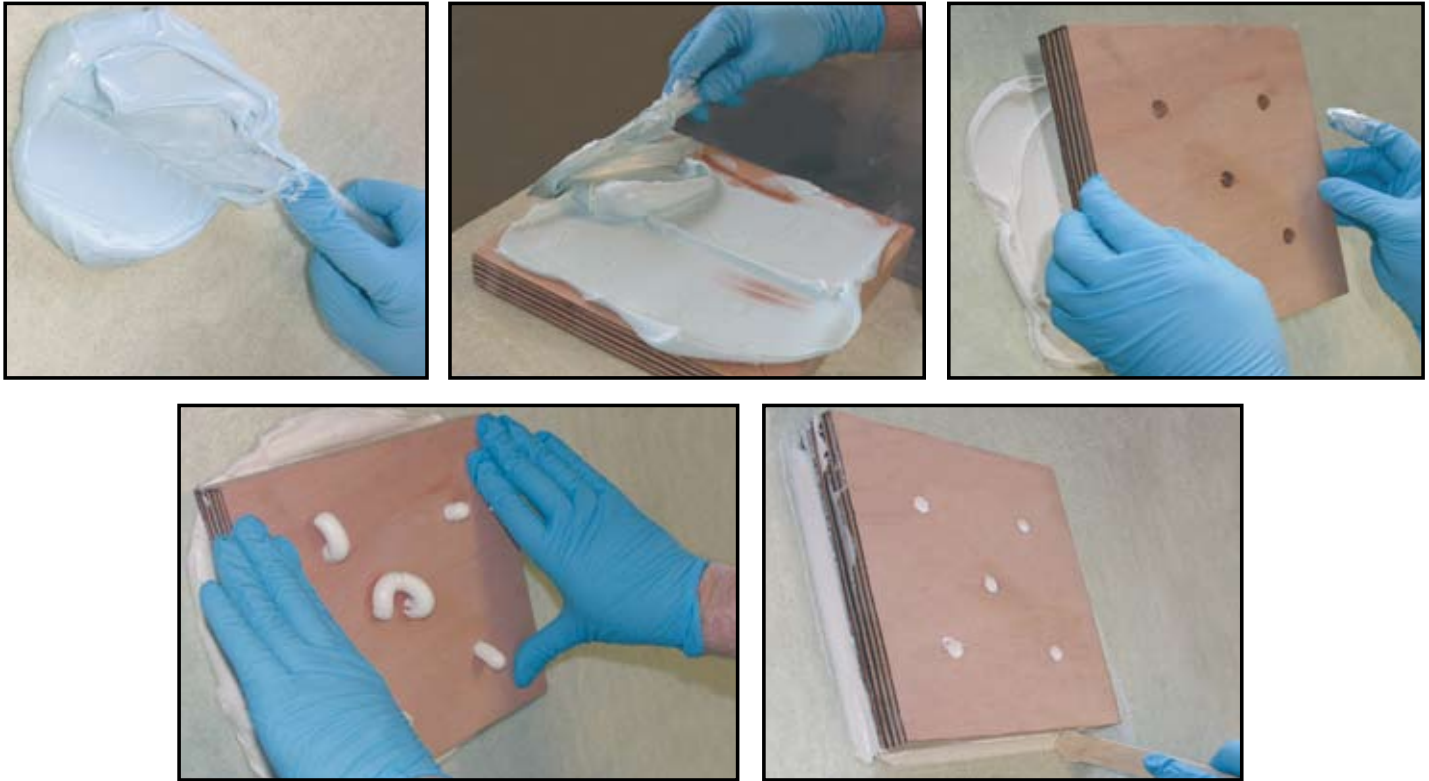
- **vastly improved performance**
- **improved working environments**
- **lighter structures**
- **lower overall costs**



Bulkhead fixing viewed from above

Crystic Bonding Pastes

Crystic® Bonding Pastes are designed specifically for applications requiring a high performance adhesive that offers advantages that include improved productivity and considerable weight savings. Crystic® Bonding Pastes have been carefully formulated for ease of application and have exceptional handling properties. The range boasts a choice of gel times and densities to suit all applications.



Product Range Overview

PRODUCT	DESCRIPTION	INITIAL COLOUR	FINAL COLOUR	DENSITY	GELTIME @25°C -1% MEKP	GELTIME @25°C -2% MEKP	ELONGATION AT BREAK %	GRP-GRP LAP SHEAR (MPA)
BP 90-78PA	Fast cure orthophthalic gap filler/bonding paste for GRP and wood substrates	White	White	1.2	8	N.A	1.0	10.5
BP 90-79PA	Fast cure orthophthalic gap filler/bonding paste for GRP and wood substrates	Grey	Grey	1.2	4	N.A	1.3	10.9
BP 90-80PA	Orthophthalic bonding paste reinforced with 3mm glass fibres	White	White	1.3	22	12	0.8	9.7
BP 90-81PA	Orthophthalic lightweight bonding paste	Bluish	White	0.7	18	8	1.2	7.3
BP 90-82PA	General purpose orthophthalic bonding paste	Bluish	White	1.3	28	12	2.8	11.2
BP 90-83PA	Flexible general purpose orthophthalic bonding paste	Bluish	White	1.3	N.A	30	4.0	9.8
BP 90-84PA	Orthophthalic lightweight bonding paste with low exotherm	Bluish	Cream	0.6	N.A	30	6.0	8.2

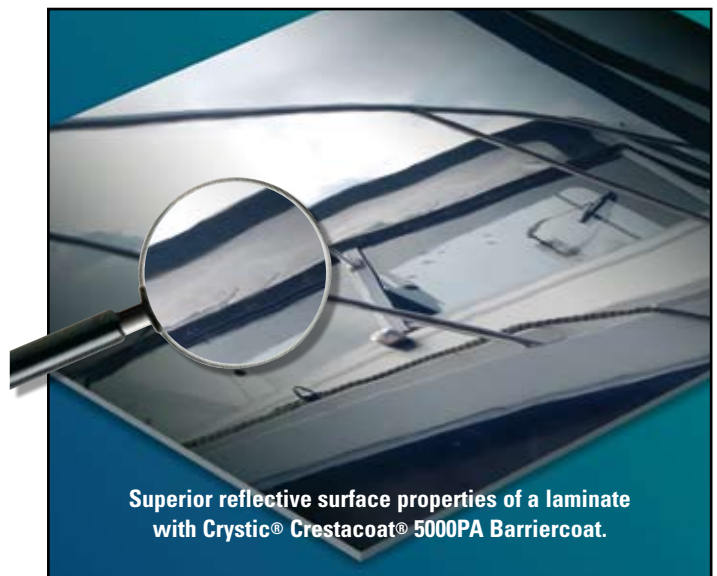
Create The Ultimate Surface Finish With Crystic Crestacoat® 5000PA

Simply add 1mm directly behind the gelcoat layer to achieve a high definition, mirror-like deep lustre gelcoat surface.

- Eliminates fibre pattern and orange peel.
- Improves laminate flexibility helping to prevent gelcoat cracking.
- Lightweight formulation means only 600g/m² is needed.
- Easy application - brush and spray variants available.

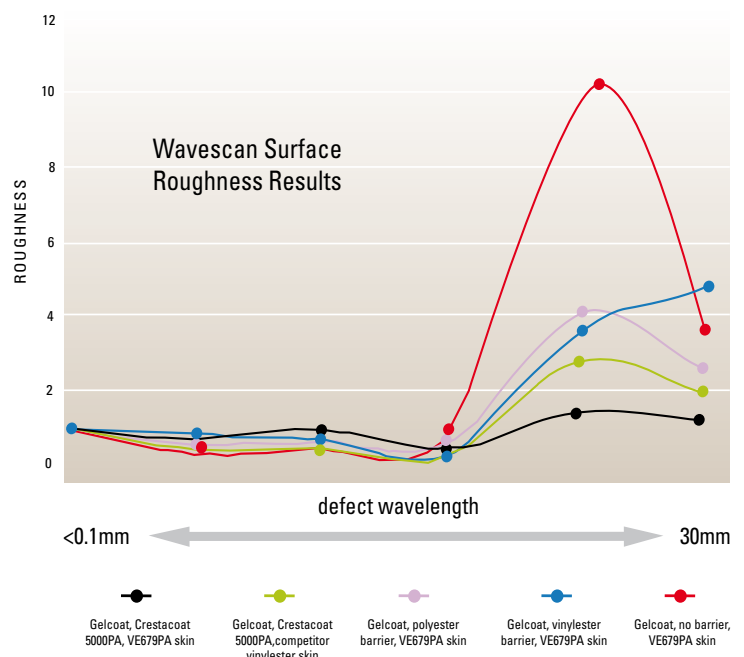
Proven Blistering Resistance

A rigorous 12-month test has shown that Crystic® Crestacoat® 5000PA can be used with confidence in a marine environment when used with a vinyl ester skincoat. This proven blistering resistance means it can be used both above and below the waterline.



Outstanding Performance

The wavescan graph shows data comparing combinations of different skincoats and barriercoats. The red line depicts gelcoat without barriercoat and it shows a significantly rougher surface than those surfaces with a barriercoat layer. A range of barriercoats have been tested, including vinyl ester and polyester barriercoats, but Crystic® Crestacoat 5000PA with its unique urethane acrylate chemistry has been proven to produce the smoothest surfaces, shown by the green and black lines. In practical terms, this means that problems with orange peel and fibre pattern are eliminated. Crystic® Crestacoat 5000PA backed with Crystic® VE679PA (black line) shows surface aesthetics superior to all other combinations. This combination produces results that would even significantly outperform many spray painted parts in the automotive industry.



Crystic Matched Tooling System

The quality of your mouldings can only be as good as the quality of your mould, therefore it is essential that an appropriate quality of tooling system is used.

Scott Bader's new high performance Matched Tooling System* achieves an excellent standard of mould production using chemically matched products that work together.

The benefits of this tooling system include:

- **Significantly increases the lifetime of moulds in production**
- **Enhanced gloss finish and gloss retention compared to competitive products**
- **Easy to apply to required thickness**
- **Trouble-free de-moulding even complicated shapes**
- **Reduced water marking**
- **Reduced fibre print through resulting in a much smoother gelcoat surface**
- **Fast mould production**



PLUG PREPARATION

It is also important to ensure the plug is of a high standard, as this will affect the quality of the mould.

1 Apply Crystic Primecoat to plug and polish

Primecoat is designed for rapid top quality surfacing of patterns

2 Apply Crystic Glosscoat to plug and polish

Glosscoat is used alongside Primecoat to give a glossy, highly durable surface finish

Apply release agents at this stage before continuing with tool construction

TOOL CONSTRUCTION

1 Apply Crystic Gelcoat 14PA

14PA is a vinyl ester brush gelcoat with excellent heat and chemical resistance, high impact strength and superior gloss. Advised for elimination of water-marking.

2 Apply Crystic VE679PA Skincoat

VE679PA Skincoat is an easy to use vinyl ester / DCPD skincoat which significantly reduces the occurrence of fibre print through.

3 a. Rapid Tooling Resin – Crystic RTR 4000PA or b. Conventional Construction Resin – Crystic 474PA

RTR 4000PA is a pre-accelerated low profile, thixotropic resin specifically designed for rapid tool making. It has improved shrinkage control giving good handling and rapid cure. It is catalysed with MEKP.

474PA is a thixotropic, pre-accelerated polyester resin with good heat and chemical resistance properties. It is ideally suitable for the production of heat resistant, dimensionally stable moulds.

Crystic Mouldguard

Often, decommissioned moulds are stored outside where they are subjected to standing water, UV light, dirt and frost. Under these conditions moulds can become damaged or scratched. Many hours are usually wasted repairing moulds, cleaning and polishing the gelcoat surface ready for use. Most moulders would agree that they rarely achieve the same quality of surface that they had before storage.

Temporary Protective Coating

Crystic® Mouldguard is our peelable temporary protective coating for moulds so **eliminating the need for costly repairs**. Moulds are back in production **significantly quicker** and **with much less labour** required than with other traditional techniques. Mouldguard is weather-resistant in warm or wet conditions for at least 12 months. Brush and spray variants are available.

Extremely Easy Handling

To use, simply add 2% MEKP catalyst and either brush or spray a single coat onto the mould surface, which must have a release agent. This single coat will cure quickly to give a weather-resistant tight plastic film which can be peeled away easily revealing a perfectly clean surface.



Customer Experiences

“We have tried a number of other protection coatings and **Crystic® Mouldguard out performs them all!**”

Shaun Davy -Princess Yachts International



“The best thing about Crystic® Mouldguard is that our moulds **look as good after long term storage as they did before** they went outside – normally they have dulled and no amount of polishing can get the original gloss back.”

Derek Palmer – Northshore Yachts

“Crystic® Mouldguard is an excellent product which has **saved us a significant amount of time bringing stored moulds back into production**. A typical mould of 4.5m squared has saved us 2 hours in labour using Crystic® Mouldguard. We are very happy with the product.”

Duncan James - Henleycraft

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Leading composites innovation for over 60 years

