



CRESTOMER[®]

Urethane Acrylate Structural Adhesives



ADHESIVES by
SCOTT BADER

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Urethane Acrylate Structural Adhesives

Crestomer® structural adhesives are used in a wide range of demanding applications in a variety of markets.

The key features and benefits for customers are:

- ▶ Structural adhesives
- ▶ Considerable weight savings versus traditional GRP joining techniques
- ▶ Excellent impact and fatigue performance
- ▶ Low VOC emissions

Stronger, Lighter, Quicker, Tougher.

A Record Of Achievement

The Crestomer® pedigree was established over 40 years ago. The first commercial application for Crestomer® adhesive was in the manufacture of minehunters. The unique properties of Crestomer® ensured peel and crack resistance was significantly improved. Crestomer® is the only successful material specifically designed to meet this demanding application.

Challenging Mindsets

Crestomer's outstanding performance record and unique properties have fundamentally challenged conventional thinking among moulders, who have been sceptical of the performance possibilities with adhesives. Freed from the constraints of traditional fabricating techniques, FRP moulders are now capitalising on the design flexibility, time and cost savings that structural adhesives can offer. Crestomer® is now used in a wide range of demanding applications across the marine, transport, building and construction sectors within the FRP industry.

Princess Yachts International (front cover and right) and the Vosper Thornycroft built minesweeper (inset right) all use Crestomer® products for demanding structural bonding applications.



Chemistry and Bonding



Marine
from kayaks to super yachts



Land & transportation
buses, coaches, cars, trains and trucks



Building & construction
doors, windows and cladding



Wind energy
blades, housing and nacelles



Recreational vehicles
motorhomes and caravans



Agricultural vehicles
tractors, diggers, off-road and combine harvesters

Crestomer® Dispensing Equipment

- ▶ Crestomer® Advantage 10, 30 and 60 cartridges can be used with a manual or pneumatic gun. Suitable dispense guns and static mixers are available from Scott Bader.
- ▶ Crestomer® adhesives can be dispensed directly from pails and drums using a manual or automated dispensing machine/ putty gun.
- ▶ Scott Bader technical support can provide advice on appropriate dispensing equipment.



Product Range Overview

Crestomer® Product	Description	Approvals	Appearance	Working time (mins)	***Fixture time (hours)	Tensile strength (MPa)	Tensile modulus (MPa)	Tensile Elongation (%)	Specific Gravity (g/ml)
1150PA	High performance structural adhesive with shorter fixture time	Lloyds, Class NK	Mauve Gel	*50	5	22 - 25	1000 - 1500	100 - 120	1.05
1151A	Adhesive for bulk application Amine accelerated	Lloyds, DNV.GL, Class NK	Green/ Yellow Gel	**25	2.5	22 - 25	1000 - 1500	100 - 120	1.05
1152PA	High performance structural adhesive	Lloyds, RINA, DNV.GL, Class NK	Mauve Gel	*50	10	22 - 25	1000 - 1500	100 - 120	1.05
1153PA	High performance structural adhesive with long open time	Lloyds, RINA, Class NK	Mauve Gel	*90	8.5	22 - 25	1000 - 1500	100 - 120	1.05
1186PA	Multi-purpose structural adhesive	Lloyds	Grey Paste	*50	5.5	13 - 16	700 - 900	4 - 7	1.30
1196PA	Low density structural core bonding adhesive	Lloyds, DNV.GL	Pink Paste	*50	6.5	19 - 22	1000 - 1500	4 - 7	0.60
Advantage 10	High performance structural adhesive for bonding a wide range of substrates. Minimal surface preparation required. Pre-packed in cartridges.	Lloyds	White Paste	10	1.2	22 - 25	400 - 600	100 - 120	1.15
Advantage 30		Lloyds, RINA, DNV.GL	White paste	30	2.5	22 - 25	400 - 600	100 - 120	1.15
Advantage 60		Lloyds	White paste	60	3.0	22 - 25	400 - 600	100 - 120	1.15

* Butanox® M-50 at 25°C **2% Perkadox® BT-50 at 25°C ***Time taken at 23°C to achieve 1.4MPa strength in lap-shire tests according to BS ISO 4587

Pack Size

The Crestomer® range is available in 20 litre kegs and 200 litre drums. Weights vary depending on S.G. Crestomer® Advantage 10, 30 and 60 are packed in 10:1 380ml coaxial cartridges. Manual and pneumatic guns plus static mixers are also on the product range.

Bond Strengths With Different Substrates

Crestomer® can be used to bond many substrates. The following tables give typical examples of bond strengths and types of failure mode observed when bonding various substrates with different products from the Crestomer® range. All figures shown are for lap shear strengths (MPa).

Crestomer® 1152PA	FRP	Marine Ply	Aluminium*	Stainless Steel*
FRP	10	-	-	-
Marine Ply	-	5	-	-
Aluminium	-	-	15	-
Stainless Steel	-	-	-	12

Results achievable with Crestomer® Advantage and Crestomer® 1153PA are similar to those shown right

Crestomer® 1186PA	FRP	Marine Ply	Aluminium	Stainless Steel
FRP	10	-	-	-
Marine Ply	-	5	-	-
Aluminium	-	-	10	-
Stainless Steel	-	-	-	8

Crestomer® 1196PA	FRP	Balsa	PVC Foam (80kg/m3)	Substrate failure	Cohesive failure
FRP	10	6			

*Requires surface preparation

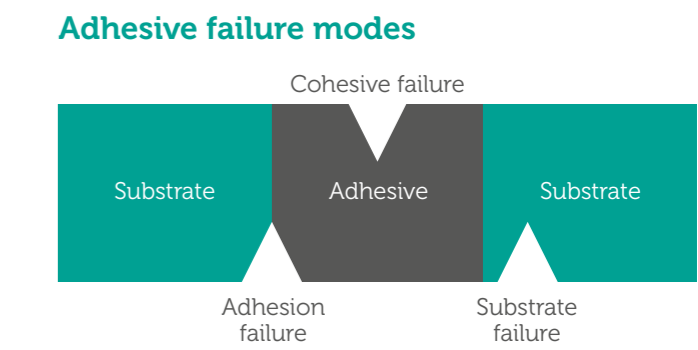
Fillet joints constructed using Crestomer® 1152PA are stronger and aesthetically superior to FRP laminated joints as well as being quicker to manufacture and giving far lower styrene emission.

There are three different ways in which a joint can fail.

Substrate failure indicates that the adhesive is stronger than the materials being bonded together.

Cohesive failure is a failure of the bulk adhesive itself and is characterised by a film of adhesive being left on both sides of the failed joint.

Adhesive failure occurs in the bond line between the adhesive and substrate and is characterised by the film of adhesive being left on one side of the failed joint.



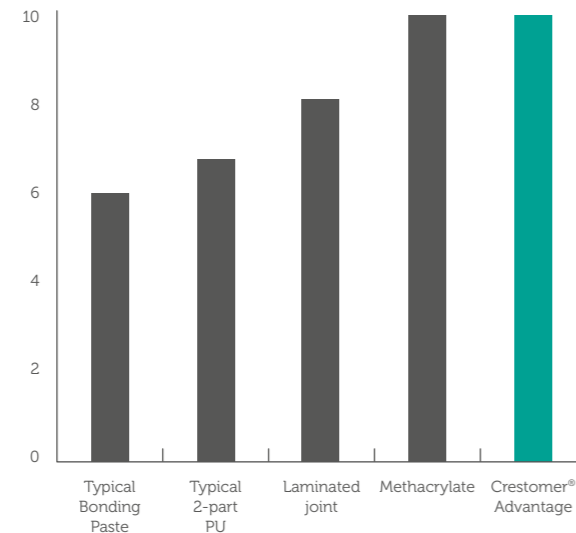
Comparisons With Competitive Materials

Crestomer® adhesives are one of a wide variety of materials that can be used in bonded assemblies. Compared to other adhesives, Crestomers offer the following benefits:

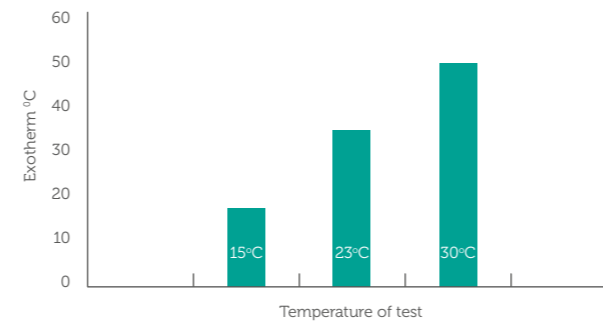
- ▶ Monomer type identical to polyester resins
- ▶ Cured with conventional peroxides
- ▶ Low exotherm during cure
- ▶ Available in a range of working and fixture times
- ▶ Ease of application
- ▶ Cost effective

High exotherm in an adhesive can cause the substrate to distort and give poor aesthetic characteristics to the parts being bonded. The chemistry of Crestomer® adhesives ensures that high exotherm temperatures, a characteristic of some other adhesives do not occur. The graph shows the exotherm temperatures of Crestomer® adhesives over a range of test temperatures.

FRP to FRP bond strength

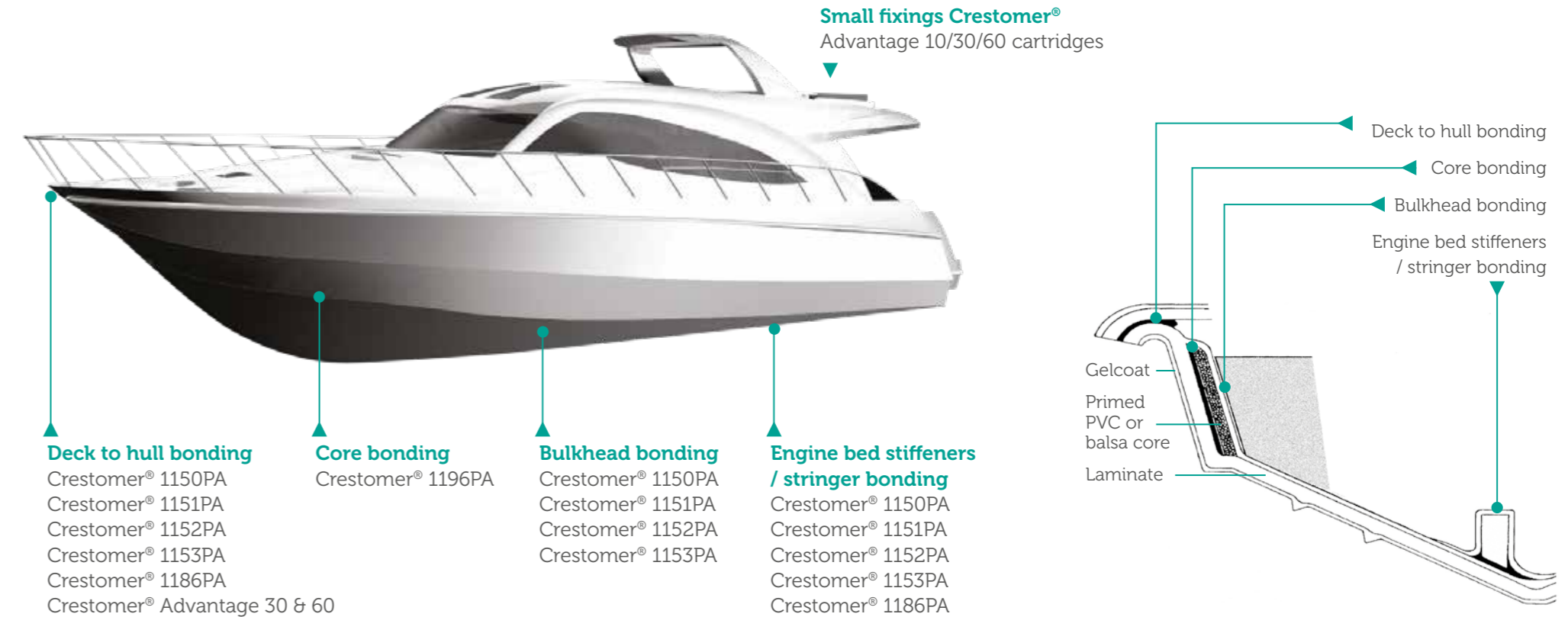


Exotherm of Crestomer® adhesives



Crestomer® In Action

Crestomer® products have been successfully used by leading global boatbuilders to improve the performance of their products, to make productivity improvements through time savings in construction and to provide considerable weight savings. The following diagram shows areas where Crestomer® structural adhesives can be used in FRP boatbuilding.





Making a **positive** difference

Scott Bader Commonwealth Ltd - A common trusteeship company

Scott Bader Group Companies

Head Office

Scott Bader Company Limited

Wollaston, England

Tel: +44 (0)1933 663100

Fax: +44 (0)1933 666139

Email: enquiries@scottbader.com

Scott Bader France

Amiens, France

Tel: +33 3 22 66 27 89

Fax: +33 3 22 66 27 80

Email: info_distribution@scottbader.fr

Scott Bader Spain

Barcelona, Spain

Tel: +34 93 553 1162

Fax: +34 93 553 1163

Email: diazs@scottbader.es

Scott Bader Germany

Weiden, Germany

Tel: +49 961 401 84474

Fax: +49 961 401 84476

Email: composites@scottbader.de

Scott Bader Ireland

Dublin, Ireland

Tel: +353 1801 5656

Fax: +353 1801 5657

Email: composites@scottbader.ie

Scott Bader Scandinavia AB

Falkenberg, Sweden

Tel: +46 346 10100

Fax: +46 346 59226

Email: composites@scottbader.se

SB Eastern Europe s.r.o

Mimon II, Czech Republic

Tel: +420 (0) 487 863 880

Fax: +420 (0) 485 111 254

Email: miro@abee.cz

Scott Bader Croatia

Zagreb, Croatia

Tel: +385 1 240 6440

Fax: +385 1 240 4573

Email: info@scottbader.hr

Scott Bader North America

Stow, OH, USA

Tel: +1 330 920 4410

Fax: +1 330 920 4415

Email: info@scottbader-na.com

Scott Bader South Africa

Hammarsdale, South Africa

Tel: +27 31 736 8500

Fax: +27 31 736 8511

Email: composites@scottbader.co.za

Scott Bader Middle East Limited

Dubai, United Arab Emirates

Tel: +971 481 50 222

Fax: +971 488 35319

Email: info@scottbader.ae

Scott Bader Asia Pacific

Shanghai, China

Tel: +86 (21) 5298 7778

Fax: +86 (21) 5298 8889

Email: info@scottbader.cn

Satyen Scott Bader Pvt. Ltd

Mumbai, India

Tel: + 91 22 4220 1555

Fax: + 91 22 2491 1262

Email: info@satyempolymers.com

NovaScott Especialidades Químicas Ltda

Civit II, Serra, ES 29165-973, Brazil

Tel: +55 27 3298-1100

Email: info@novascott.com.br

Scott Bader Japan KK

Yokohama, Japan

Tel: +81 (0)45-620-3745

Email: enquiries@scottbader.com

Scott Bader Australia

Perth, Australia

Tel: +61 (08) 9418 4555

Email: info@scottbader.com.au

Scott Bader Italia

Tel: +39 3454534391

Email: enquiries@scottbader.com



+44 (0)1933 663100
enquiries@scottbader.com
scottbader.com



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