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**

**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

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

*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).

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.

### Crestomer® 1152PA

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

### Crestomer® 1186PA

### Crestomer® 1196PA

<table>
<thead>
<tr>
<th>Substrate</th>
<th>FRP</th>
<th>Marine Ply</th>
<th>Aluminium*</th>
<th>Stainless Steel*</th>
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<tbody>
<tr>
<td>FRP</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marine Ply</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Aluminium</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</table>

<table>
<thead>
<tr>
<th>Substrate</th>
<th>FRP</th>
<th>Marine Ply</th>
<th>Aluminium</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRP</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marine Ply</td>
<td>-</td>
<td>5</td>
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</tr>
<tr>
<td>Aluminium</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>-</td>
<td>-</td>
<td>8</td>
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</table>

<table>
<thead>
<tr>
<th>Substrate</th>
<th>FRP</th>
<th>Balsa</th>
<th>PVC Foam (80kg/m3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRP</td>
<td>10</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

*Requires surface preparation
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.
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.
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@sbee.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 22 291 1262  
Email: info@satyenpolymers.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