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.
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

- The Crestomer® Advantage 30/10 cartridges can be applied using a manual or pneumatic gun. Suitable manual and pneumatic guns plus static mixers are available to purchase from Scott Bader.
- Pails and drums can be dispensed using an automated 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>*Gel time (mins)</th>
<th>**Fixture time (hours)</th>
<th>Tensile strength (MPa)</th>
<th>Tensile modulus (MPa)</th>
<th>Elongation at break (%)</th>
<th>Performance characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1150PA</td>
<td>High performance structural adhesive with shorter fixture time</td>
<td>N/A</td>
<td>Mauve Gel</td>
<td>*50</td>
<td>**5</td>
<td>25</td>
<td>1000</td>
<td>100</td>
<td>Structural adhesive for demanding applications on smaller components</td>
</tr>
<tr>
<td>1151PA</td>
<td>Adhesive for bulk application Amine accelerated</td>
<td>Lloyds, DNV</td>
<td>Green/Yellow Gel</td>
<td>*25</td>
<td>**2.5</td>
<td>22</td>
<td>500</td>
<td>&gt;100</td>
<td>Structural adhesive for demanding applications</td>
</tr>
<tr>
<td>1152PA</td>
<td>High performance structural adhesive</td>
<td>Lloyds, DNV, RINA</td>
<td>Mauve Gel</td>
<td>*50</td>
<td>**10</td>
<td>26</td>
<td>1400</td>
<td>100</td>
<td>Structural adhesive for demanding applications</td>
</tr>
<tr>
<td>1153PA</td>
<td>High performance structural adhesive with long open time</td>
<td>Lloyds, RINA</td>
<td>Mauve Gel</td>
<td>*90</td>
<td>**8.5</td>
<td>23</td>
<td>500</td>
<td>115</td>
<td>Long gel time structural adhesive for demanding applications on large components</td>
</tr>
<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>14</td>
<td>800</td>
<td>6</td>
<td>High strength gap filling adhesive</td>
</tr>
<tr>
<td>1196PA</td>
<td>Structural core bonding adhesive</td>
<td>Lloyds, DNV</td>
<td>Pink Paste</td>
<td>*50</td>
<td>**6.5</td>
<td>20</td>
<td>1300</td>
<td>4</td>
<td>Low density adhesive specifically developed for demanding core bonding applications</td>
</tr>
<tr>
<td>Crestomer® Advantage 30</td>
<td>High performance structural adhesive pre-packed in cartridges</td>
<td>Lloyds, DNV, RINA</td>
<td>White Paste</td>
<td>30</td>
<td>**2.5</td>
<td>15</td>
<td>340</td>
<td>&gt;85</td>
<td>High performance structural adhesive for convenience and flexibility</td>
</tr>
<tr>
<td>Crestomer® Advantage 10</td>
<td>High performance structural adhesive for bonding a wide range of substrates</td>
<td>N/A</td>
<td>White paste</td>
<td>10</td>
<td>**1.2</td>
<td>20</td>
<td>920</td>
<td>&gt;85</td>
<td>High performance structural adhesive with excellent adhesion and gap filling capabilities</td>
</tr>
</tbody>
</table>

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

### Packaging and equipment

The Crestomer® range is available in kegs (pails) with some products also supplied in drums. Crestomer® Advantage 30 is packed in 380ml cartridges. Manual and pneumatic guns plus static mixers are also on the product range.
Crestomer® can be used to bond many substrates. The following tables give typical examples of bond failure rates and types of failure observed when bonding various substrates with different products from the Crestomer® range. All figures shown are for lap shear strengths (MPa).

### Bond Strengths With Different Substrates

**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 bond.
- **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.

<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>
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<td>-</td>
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<tr>
<td>Stainless Steel</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>
<th>Stainless Steel</th>
</tr>
</thead>
<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>10</td>
<td>-</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
</tbody>
</table>

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

*Requires surface preparation

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**Adhesive failure modes**

- Substrate failure
- Cohesive failure
- Adhesion failure
- Substrate failure
Comparisons With Competitive Materials

Crestomer® adhesives are one of a wide variety of materials that can be used to bond substrates. 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 gel and curing 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® products have been successfully used by leading European 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.
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