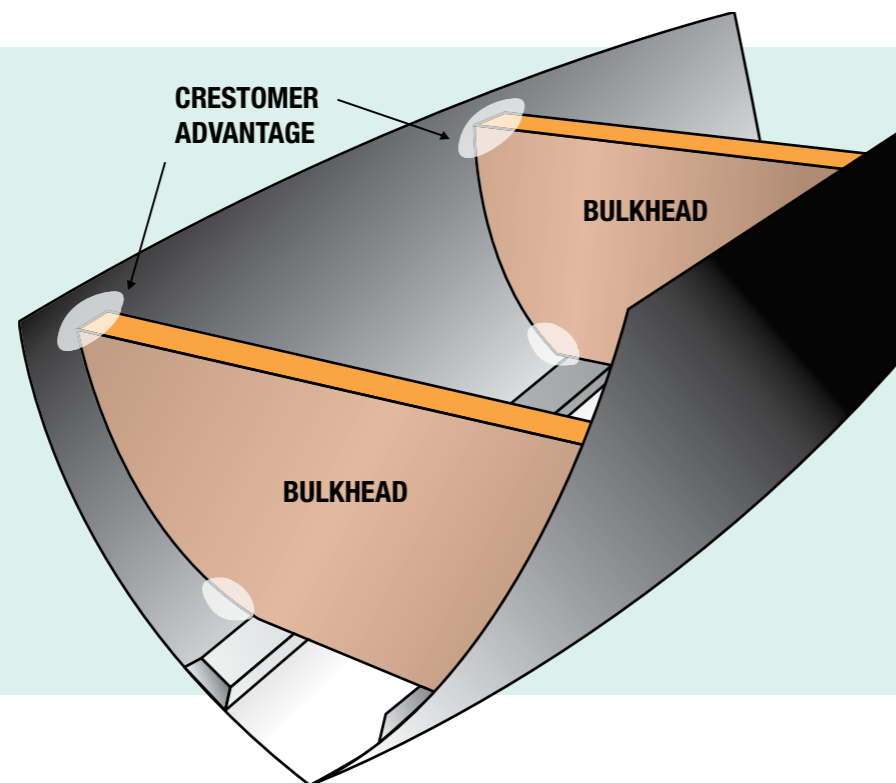


10 The support structure for the bulkheads can be carefully removed 2 hours after the Crestomer was catalysed, but care should be taken to ensure no excessive loads are placed on the bulkheads for 12 hours.

11 If the support structure needs to be removed in under two hours, Crestomer Advantage 10 can be used to form a 50mm long fillet at the top and bottom of each bulkhead and on each side. The rest of the fillet can then be formed with 1152PA or 1155PA. The bulkhead support structure can then be carefully removed 45 minutes after the Advantage 10 has been applied.



### Cost / Weight Saving

These figures are typical of a 16 metre boat with 20 metres of bulkhead bonding.

16 METRE HULL	WEIGHT	MATERIAL COSTS	LABOUR TIME
LAMINATE	89.4kg	£131.20 €182.37	5 hours 30 minutes (6 operators)
CRESTOMER***	8.6kg	£104.20 €144.84	35 minutes (3 operators)
<b>SAVING USING CRESTOMER</b>	<b>80.8kg</b>	<b>£27.00 (€37.53)</b>	<b>31 hours 15 minutes</b>
<b>PERCENTAGE SAVING</b>	<b>90%</b>	<b>9.5%</b>	<b>95%</b>

Costs used		
Crestomer 1152PA	£ 12.00 /kg	(€16.68 / kg)
Resin	£ 1.45 /kg	(€ 2.02 / kg)
Glass CSM	£ 1.25 /kg	(€ 1.74 / kg)
Woven	£ 1.90 /kg	(€ 2.64 / kg)
Peroxide	£ 2.75 /kg	(€ 3.05 / kg)

\*\* GRP Joint Construction  
3 layers of 600gm2 (Resin to glass ratio 2.5:1), 1 layer of 800 gm2 Woven Roving (Resin to glass ratio 1:1); Resin catalysed at 2%; 30cm tie in

\*\*\* Crestomer Joint Construction 25mm radius, Crestomer catalysed at 2%

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Bulkhead/App/Guide 09/08



## APPLICATION GUIDE

# Bonding Bulkheads to an FRP Boat Hull

Crystic Crestomer® structural marine adhesives are used by the leading boat builders around the world. Customers using Crestomer 1152PA to bond bulkheads to hulls with fillet joints gain the following advantages compared to conventional laminated joints:

- Superior external cosmetics with zero print through of the joint
- Potential labour savings of more than 60%
- Better internal aesthetics, cleaner looking joints
- Considerable weight savings
- Much cleaner and easier to use – improved working conditions
- Improved productivity
- Significantly reduced styrene emissions
- No grinding required



The unique chemistry of Crystic Crestomer® structural adhesives is perfectly suited to bulkhead bonding. Unlike other adhesives, Crystic Crestomers bond perfectly to all types of wood, including marine ply, teak, and pine, without any special preparatory treatment.

Crystic Crestomer 1152PA also offers significant superiority over polyester bonding pastes and GRP lamination in adhesion, impact resistance and resistance to crack propagation

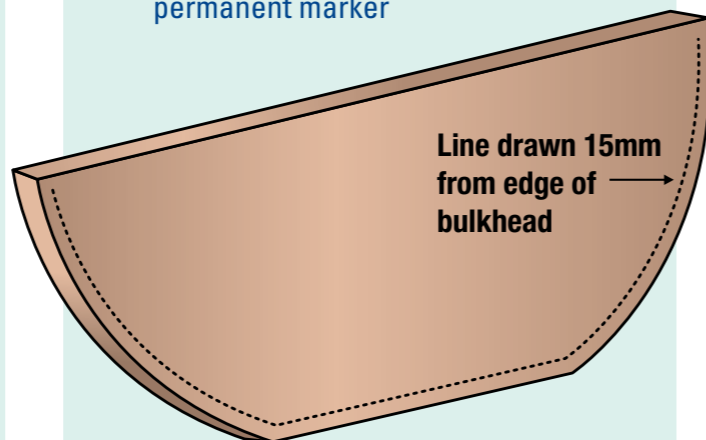
**Stronger Lighter Quicker Tougher**



**1** No additional laminate preparation is required to that needed for a conventional laminated joints. Ensure surfaces are prepared properly. If the laminate is less than 72 hours old then it should simply be clean and sound. If it is over 72 hours old then you should use a peel ply in the area to be bonded. If a peel ply hasn't been used; if the laminate is over 72 hours old; or if the laminate uses a DCPD resin that has been exposed to UV light, then the following preparation of the surfaces to be bonded is recommended:

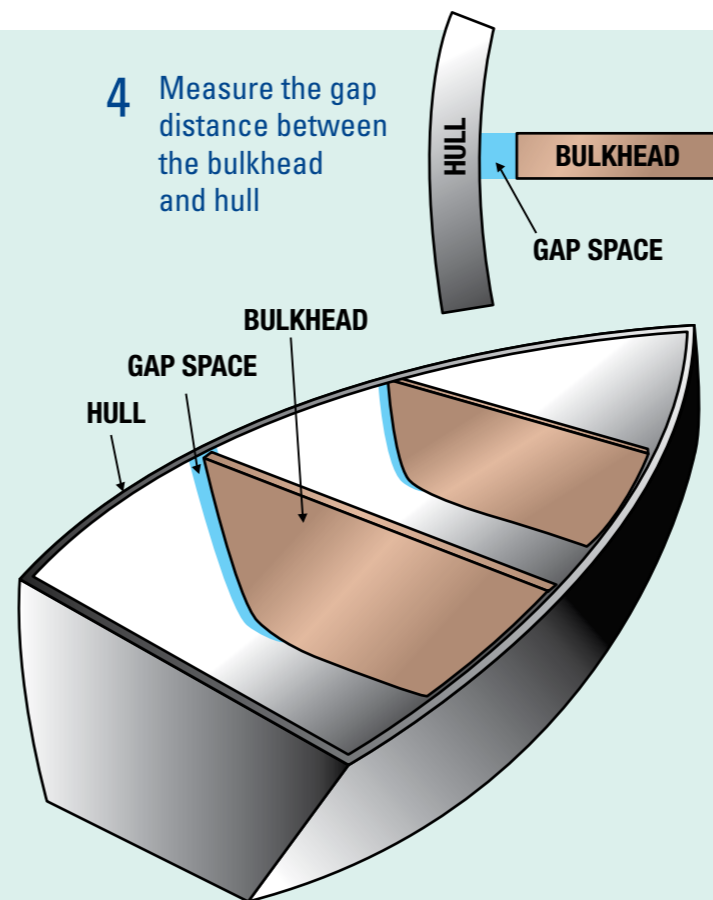
- (i) Solvent Wipe (Clean Acetone or Styrene)
- (ii) Abrade (80 grit paper). The dust should be removed completely, preferably by vacuum cleaner
- (iii) Solvent Wipe (Clean Acetone or Styrene)

**2** Mark a line on either side of the bulkhead at 15mm (5/8ths) with a permanent marker



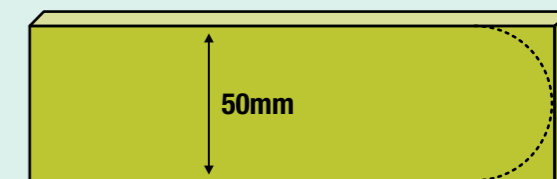
**3** Set bulkhead structure into hull so that gaps are uniform.

**4** Measure the gap distance between the bulkhead and hull



**5** Select appropriate fillet tool, which should be the same as the gap size measured above PLUS 15 mm i.e. a 10mm gap would need a 25mm fillet tool

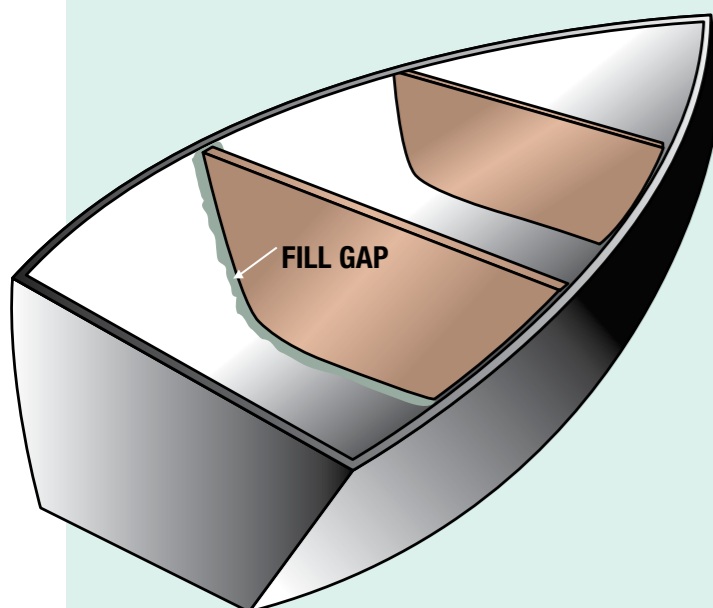
- a. The fillet tool should be made of a rigid material, a laminate is perfect
- b. Cut a laminate at twice the width of the required fillet and cut a semi circle at one end



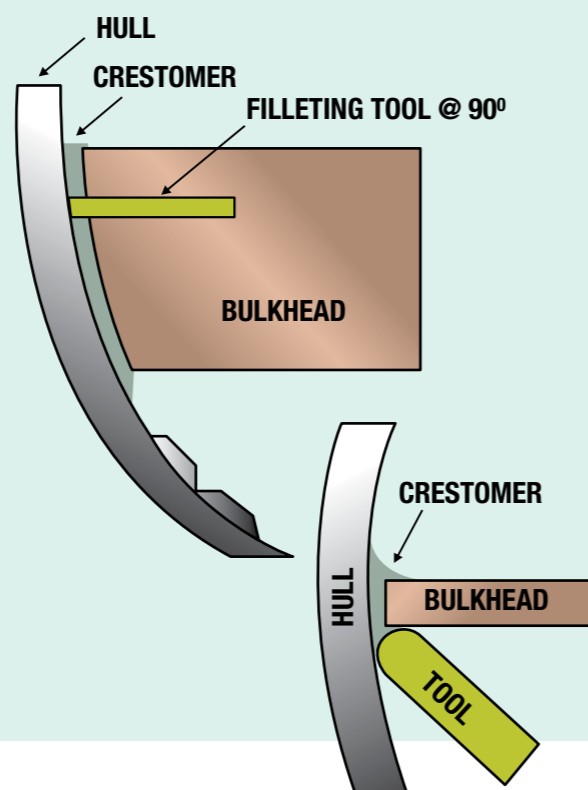
- c. It is usually worth making two or three fillet tools of different radiuses.

**6** Mix Crestomer adhesive to ensure catalyst/peroxide is fully dispersed. If using a machine,\* prime the gun to ensure proper mixing

**7** Apply catalysed material into joint. The size of the bead applied depends on the gap size between the bulkhead and hull. Ensure that Crestomer fills this gap.



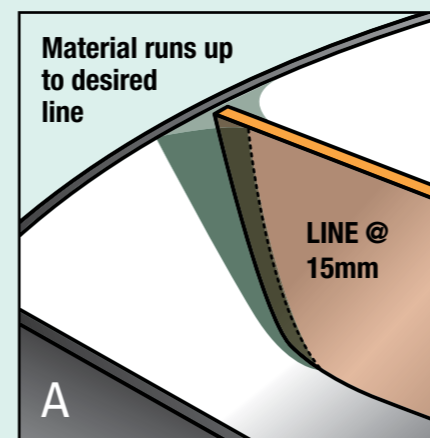
**8** With the fillet tool at a 90° angle to the joint, form a fillet and remove excess material, which can be reused.



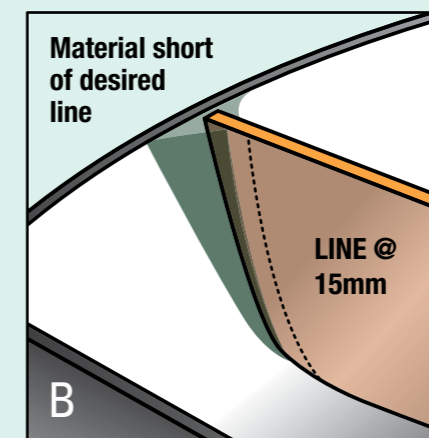
**9** Ensure that the Crestomer fillet at least touches the line mentioned in Step 2 (A, below). If the fillet is short of the line, a larger fillet tool is required (B). If the line cannot be seen, a smaller fillet tool can be used (C).

The working time available for steps 6 - 9 is 45 minutes for Crestomer 1152PA and 25 minutes for Crestomer 1155PA\*.

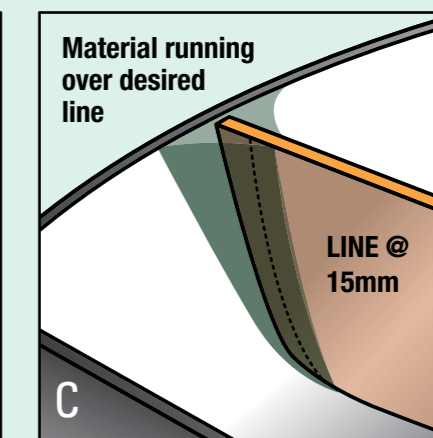
\* at 25°C using 2% Butanox M50



**A**  
= GOOD RESULT  
STRUCTURAL



**B**  
GO BACK TO STEP 5  
NOT STRUCTURAL



**C**  
TAKE CARE NOT TO WASTE MATERIAL UNNECESSARILY  
STRUCTURAL BUT WASTEFUL

\* Advice on suitable machinery can be provided on request