Yacht Inadee – MDTF7

PROCEDURE

Westerley Fulmar Windows

Toughened Glass Replacement

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1 Introduction

The windows in my 1985 Westerly Fulmar are no longer manufactured, as far as I know and the plastic panes were quite badly crazed. The aluminium frames were also showing signs of wear and tear and needed refurbishment in the form of re-anodisation.

This document sets out to detail the process, materials and contacts for the work done.

2 Frame Removal

The first job is to remove the frames, complete with window panes from the boat. There are four large frames in the cabin and four smaller frames in the forward part of the boat. Fortunately there are only the two sizes and the panes are flat.

The windows are held into the topside of the boat by 'Interscrews' which are in two parts; a normal 3.5mm screw and a 3.5mm barrel screw. See *Figure 1: Interscrews.*

Figure 1: Interscrews

I advise getting details of a supplier for the correct size Interscrew before attempting to do the work as they sometimes shear in the process of window removal. I found that Trafalgar Yacht Services based in Fareham supplied the goods in packs of twenty for about £0.70 each screw set.

2.1 Tools

I recommend using an electric screwdriver on the outside screw and a well maintained screwdriver for the inside. You will also need a short stubby driver for removal of the screws from inside the coat locker. I also found it useful to use a blunt 2 inch wide wood chisel to just tease the frame from the coach roof. There are twenty screws to each of the cabin windows and ten each for the smaller windows.

Removal and replacement of the frames is a two person job.

You will also need to prepare some sort of covering and suitable tape to cover the holes in the coach roof. The anodising process takes a couple of days and then re-assembly another day at least. I used heavy duty plastic garden refuse sacks and black 2 inch wide vinyl tape to cover the holes which did the job for almost two weeks in some blustery wet weather.

If the windows haven't been removed before they should come out fairly easily as Westerly used the same two pack putty I will use to put the windows in. If silicone has been used on subsequent window replacement then I wish you good luck with the job!

When removing the windows I identified each window with its opening and made a small scratch on the inside of the frame components to identify the top. The anodising process will actually clean off the frames and etch away any identifiers that are too small.

3 Window Removal from Frame

Once the frames are removed from the coach roof then the job of splitting the frames and removing the pane complete with rubber extrusion, without damaging any component, is required.

There are two different types of screw used for holding the two halves of the window frame together one is aluminium and the other stainless steel. I didn't manage to remove the aluminium screws successfully so my advice is to leave them. Concentrate on careful removal of the stainless steel screws with an appropriate screw driver.

On completion of removing the screws the next job is to remove the bead of black rubber sealant from around the interface between the frame and the pane on the **outside** of the frame. The rubber on the inside of the frame is part of the rubber extrusion! I found that this was a fairly easy job and the bead came away in one piece for each window.

This next task can be tricky and you should be careful not to damage the frame when initially prising the frame components apart. I used the 2 inch blunt wood chisel. The area immediately around the point where the frames are joined together has rubber sealant inserted at time of assembly to prevent water ingress through the junction between the frame halves. If silicone has subsequently been used then, uho!

The rubber seal has a cut out adjacent to the junction of the frame halves to accommodate the securing plate and screws. See *Figure 2: General View of Window Components*. After the delicate and show of strength to remove the frames from the panes you are ready to prepare the frames for the first stage of re-anodising and measure the panes so that the new toughened glass can be ordered. It is also a good idea to clean all the crud off the rubber seal; I managed to use mine again for it will last at least another ten years or so.

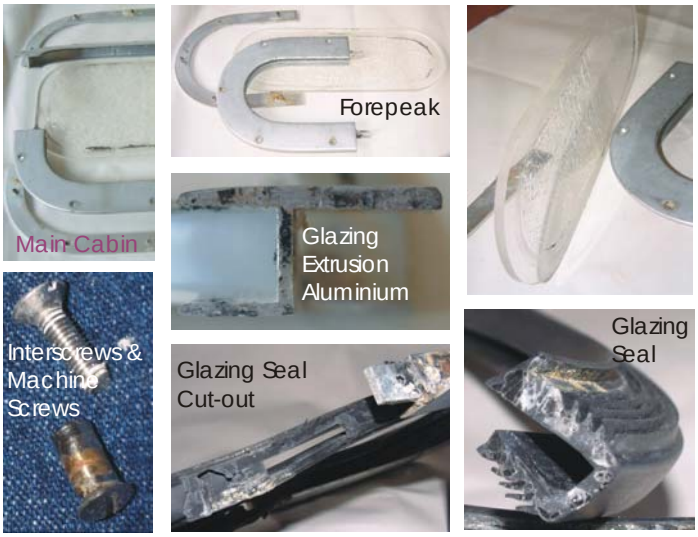

Figure 2: General View of Window Components

4 Measuring and specifying the Glass

Measuring the glass is fairly straight forward as long as you remember to specify the thickness as 5mm. Standard glass comes 6mm thick but this will almost certainly cause problems when it comes to setting the glass and seal back into the frame.

I was advised by the experts in the glass industry to specify vehicle toughening specification BS857 for the glass, as the marine specification would be exhorbitantantly priced and that the Marine Spec was intended primarily for ships with large windows and portlights.

I found two suppliers of toughened glass to meet my requirements:

Piper Glass at Watford and Crouch Marine in Essex. I chose the more expensive option, Crouch Marine, because the guy had been very helpful. See *Figure 3: Main Cabin Window Specification* and *Figure 4: Forward Windows, Heads, Lockers & Forepeak Specification* for the dimensions of my windows.

When sizing the glass be aware that it is best to be slightly undersized than oversized because of the clearance between the frame securing screws. There is a slight chance that they could come into contact with the glass when the frames are re-assembled.

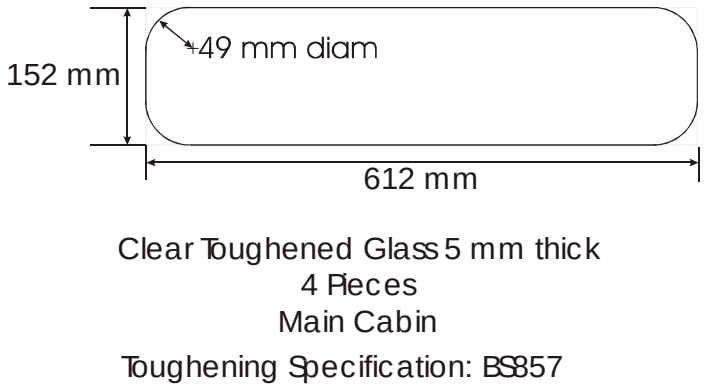

Figure 3: Main Cabin Window Specification

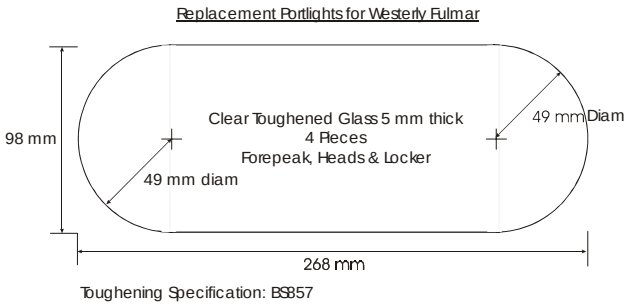

Figure 4: Forward Windows, Heads, Lockers & Forepeak Specification

I had planned to replace the rubber extrusion and did the research to find a supplier. However, after careful removal of the extrusion and pane from the frame, replacement was not necessary. The correct rubber extrusion is available from Trafalgar Yacht Services in Fareham, Hants.

Figure 5: Glazing Frame & Rubber Extrusion Cross Section, gives details of the dimensions of the aluminium frame and cross section of the rubber extrusion. Note that the higher part of the extrusion is on the inside of the frame and that after assembly it is necessary to squeeze a bead of UV resistant sealant on top of the extrusion, between the pane and the frame, on the outside.

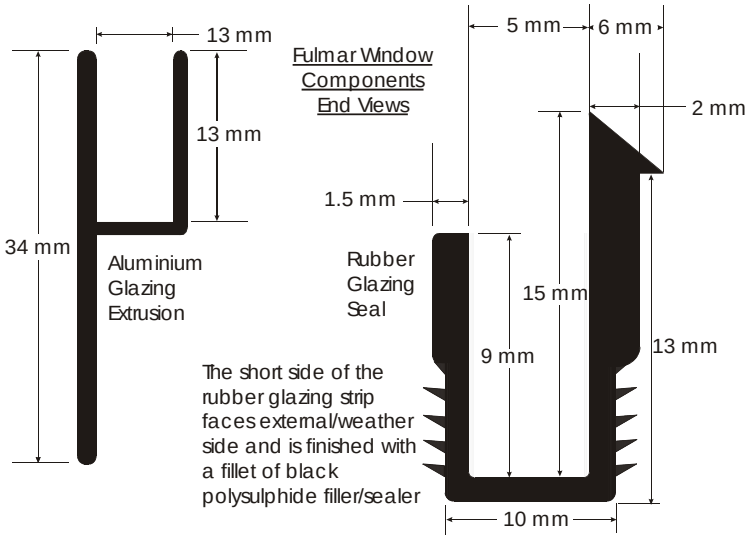

Figure 5: Glazing Frame & Rubber Extrusion Cross Section

Figure 6 shows the toughened glass prior to assembly. The glass must be cut to shape before the toughening process and is impossible to cut after toughening.

Figure 6: Toughened Glass Window Pane

5 Fitting the Glass into the Frame

To avoid creating a gap between the ends of the extrusion when re-inserting the pane and extrusion into the frame I used a little Superglue on the extrusion after assembling the extrusion around the glass. No Superglue should come into contact between the glass and the extrusion.

Figure 7: Bonding Rubber Seal

Assembly of the glass and extrusion into the frame is relatively straight forward as long as the thickness of the glass is only 5mm. I experienced one or two glass suppliers who tried to convince me that 6mm glass could be used but this is not so. If it is absolutely necessary to use any form of lubricant to get the frame and glass assembled then only lubricate the inside wall of the frame. Lubricating the outside of the frame could affect the bead of sealant from making a good seal. Just before the pane seats fully into the frame I advise using a little sealant around the extrusion adjacent to the frame joint. This will reduce the risk of water ingress. See *Figure 8*

Figure 8: Inserting Glass & Rubber Seal into Frame

Once the pane, extrusion and frame have been assembled and the seal inspected for correct seating in the frame the bead of UV resistant sealant is applied. Make sure that the seal is about 3mm below the edge of the frame so that the sealant has good contact with the frame. I found that I could just push the extrusion into the frame with the handle of an old spoon. Finally, I cleaned the glass and area where the fillet was to be inserted with methylated spirit. When applying the sealant it is good practice to trim the application nozzle to about 6 mm diameter and at an angle of about 45 degrees and to 'push' the sealant gun into the gap, not 'pull' it. See *Figure 9.*

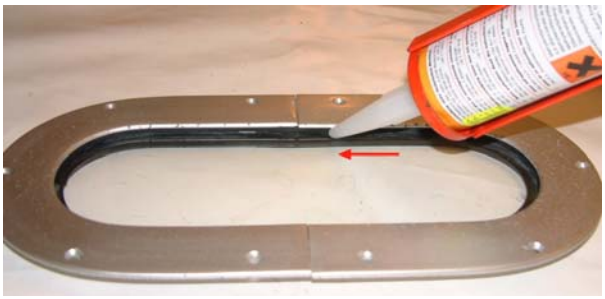

Figure 9: External Sealant Bead (Sikaflex)

Figure 9 also gives a good indication of the effect of re-anodisation. Although it does not get rid of pitting corrosion the anodising effectively anodises inside the pitting and screw countersinks.

6 Replacing the Frames in the Boat

Prior to fitting the frames into the boat it is advisable to remove all debris from around the cut-out and to clean the internal surface of the headlining which is trapped beneath the frame plates. Best to give the external surface a good clean too so that the sealing putty can make good contact.

Figure 10 and Figure 11 show the inside and outside of one of the prepared cut-outs.

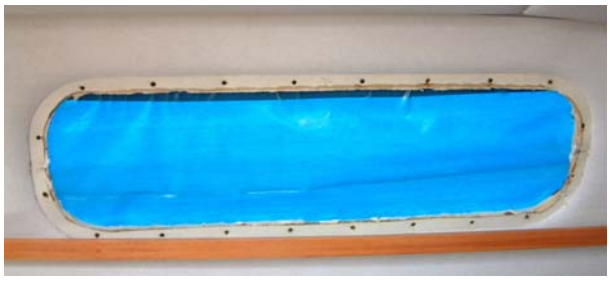

Figure 10: Main Cabin Window: Cut-out, Inside view

Figure 11: Main Cabin Window: Cut-out, Outside View

It may be a good idea to check each frame against the cut-out it was removed from just to make sure that the holes all line up before proceeding.

The next job is to kneed the two part putty. I used Marineseal 033 from Trade Sealants of Waterlooville, Hants. The putty cures like rubber with the feel and texture of an 'india' pencil rubber. The sealant is excellent for the interface sealing of keels when used with a primer, however, without a primer it is ideal for windows. At least you will be able to successfully and, relatively easily, remove the window at some time in the future.

To estimate just how much putty is required I found that a 'sausage' no more than 10mm in diameter squeezed around the outside edge of the cut-out is sufficient to be forced to the inside of the frame and to be squeezed out from the edge of the frame. The working life of the putty is more than a day so any surplus putty that is squeezed out can be re-used. I mixed about enough putty to complete two main cabin windows as it is quite a tiring job kneeding the two parts to an even consistency. Once mixed, roll the putty into a sausage and press it firmly to the edge of the cut-out. Figure 12 shows the pot of putty with one part in the plastic bag, like cheese, and the other, of similar texture in the tub. I wore vinyl gloves to kneed and handle the putty.

Figure 12: Window 2 Part Putty Sealant

Offer up the frame to the cut-out and press firmly and evenly to force the putty into the inside of the boat and from the edge of the frame. I used my feet to press the window into place, being careful not to apply pressure unevenly. It is also important to leave about 2mm thickness of sealant between the intertface of the frame and coach roof so the when the seal cures the window can be nipped up.

Next job is to insert the Interscrews and secure the window in place. I recommend that the screws are placed diagonally and tightened down evenly around the window frame. I use an electric screw driver for the job ably assisted from the inside by 'The Boss'. *Figure 13* shows the putty squeezed out from the frame.

Figure 13: Main Cabin Window Inserted

Last but not least, remove the surplus putty from the surrounding frame with some suitable spatula; I used the clean but blunt 25mm wood chisel.

Figure 14: Trimming Surplus Window Sealant