

# REVISION LIST

## CHAPTER 25: AFT WINDOWS

The following list of revisions will allow you to update the Legacy construction manual chapter listed above.

Under the “Action” column, “R&R” directs you to remove and replace the pages affected by the revision. “Add” directs you to insert the pages shows and “R” to remove the pages.

PAGE(S) AFFECTED	REVISION # & DATE	ACTION	DESCRIPTION
25-1	0/02-15-02	None	Current revision is correct
25-1	3/12-15-04	R&R	Updated table of contents with page numbers.

## Chapter 25: Aft Windows

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## 1. INTRODUCTION

The aft windows improve rear visibility and also look good! The aft windows install in a similar manner to the canopy. We like to wait as long as possible to install the aft windows for access. If you have completed all preceding chapters and don't think you need access through the aft window openings, now is the time to install them.

## 2. PARTS LIST

#	PART NO. (P/N)	QTY	DESCRIPTION	OPTIONAL ITEM <i>(not included with kit)</i>
1)	4600-01	1	AFT WINDOW, LEFT	
2)	4600-02	1	Aft Window, Right	

**Note:**

**Optional Parts available through :**

**(\*) Lancair Avionics**

**(\*\*) Kit Components, Inc.**



25-1

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AFT WINDOWS

### 3. CONSTRUCTION PROCEDURE

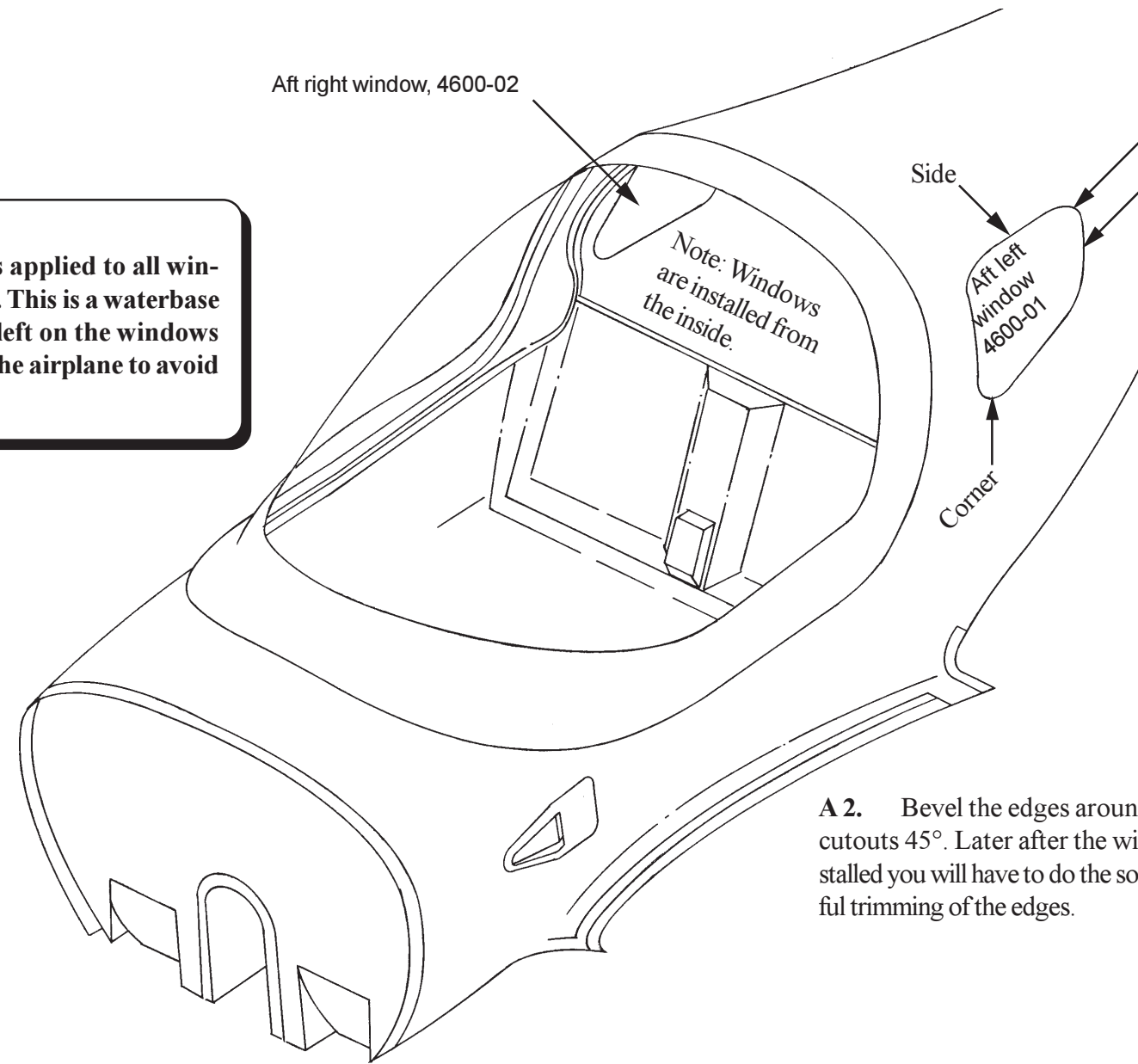
Aft Windows  
Fig 25:A:1

#### A. Preparing the Fuselage Shell

This chapter deals with the installation of the windows. Treatment and installation of the two aft windows is very similar to the canopy.

**Note:**

A protective film is applied to all windows by the manufacturer. This is a waterbase protectant and should be left on the windows until you have completed the airplane to avoid nicks and scratches.



Note: Windows are installed from the inside.

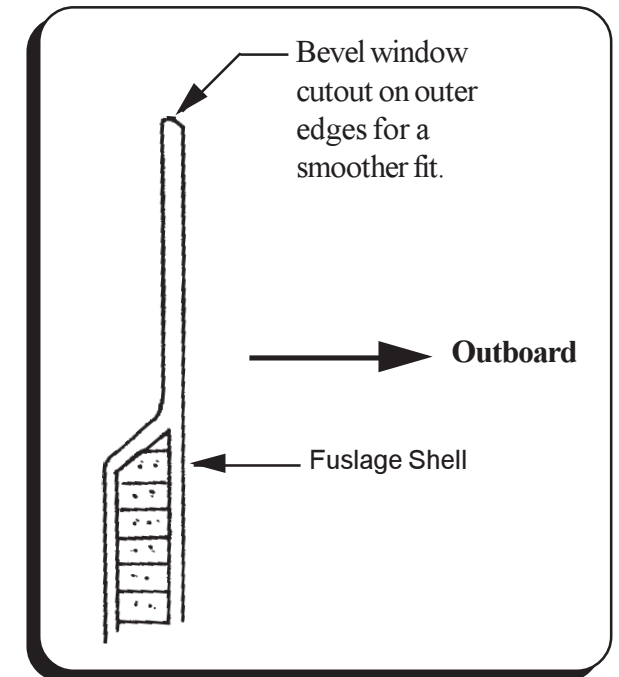
Use a piece of 80 grit sandpaper wrapped around a tube with a 4" diameter for the corners.

Use a short sanding block for the sides.

**A 1.** The window openings have been roughly trimmed at the factory. The first step is to final sand the opening.

Note that the sides have a slight curve. Don't attempt to sand them straight. Rather sight down the edges and corners and sand until it looks right.

**A 2.** Bevel the edges around the window cutouts 45°. Later after the windows are installed you will have to do the some more careful trimming of the edges.



## B. Preparing the Windows

The windows provided in your kit are oversized and must be trimmed down before bonding them to the upper fuselage shell.

Here are some do's and don'ts for handling plexiglass that have been learned from much (\$\$) experience.

**DO:** Leave the protective barrier on as much of the windows as possible for as long as possible.

**DO:** Cut the plexiglass with a band saw or an angle grinder. The band saw should have a fine tooth blade and set on low speed.

**DO:** Always keep the plexiglass held firmly against the working surfaces when cutting or trimming. An old section of carpet on your work bench lessens the danger of scratching the plexiglass.

**DON'T:** Cut plexiglass with a reciprocating blade, like a saber saw.

**DON'T:** Drill holes through plexiglass. It's too easy to crack.

**DON'T:** Clean plexiglass with acetone or MC. They may not seem to affect the surface, but these chemicals dry out the plexiglass and later cause discoloration. Cleaning should be done with Isopropyl (rubbing) alcohol.

**DON'T:** Clean the plexiglass window with rubbing alcohol in the bonding areas after sanding. The plexiglass may absorb the rubbing alcohol if sanded. Never clean the edges. The edges are rough and may absorb the rubbing alcohol.

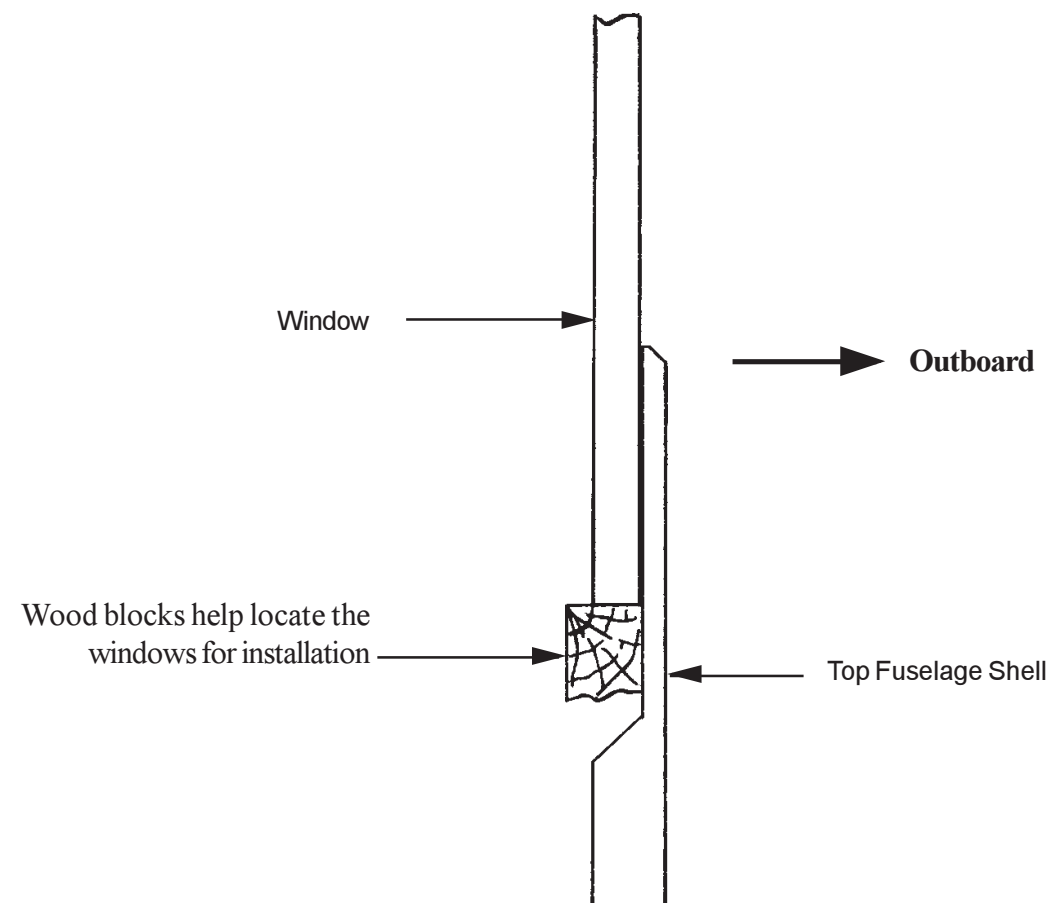
The correct method of cleaning the plexiglass window is to first clean the (unsanded) bonding surface with rubbing alcohol. Apply with a soft cloth such as a T-shirt. Sand the bonding areas thoroughly so no glossy areas remain. Using high pressure air or a clean cloth, remove the dust from the surface. Don't touch the bonding surfaces prior to bonding.

- B 1.** Set the windows into their respective locations. The windows should be equally oversized around the window cutouts. The window must be 1" (25 mm) larger than the cutouts. This will provide 1" wide bond between the windows and fuselage. You may trim the window in the areas where there is more than 1" bonding area. For cutting large areas of plexiglass, a band saw works well. For the smaller trimming jobs use an angle grinder with a 40 grit wheel. And **be careful!** The plexiglass is tough stuff, but if you try to cut too fast, or drop the window on the floor, the plexiglass can break. It is also a good idea to remove the protective barrier only in the areas that you are cutting or grinding. This will prevent the protectant from contaminating later bonds.

Note: Take your time in cutting and trimming the windows. If you are rushed, then you are more likely to damage

the windows. More than one builder has lost control of a high speed grinder and permanently engraved the plexiglass with unwanted graphics.

**Fitting Windows**  
**Fig 25:B:1**

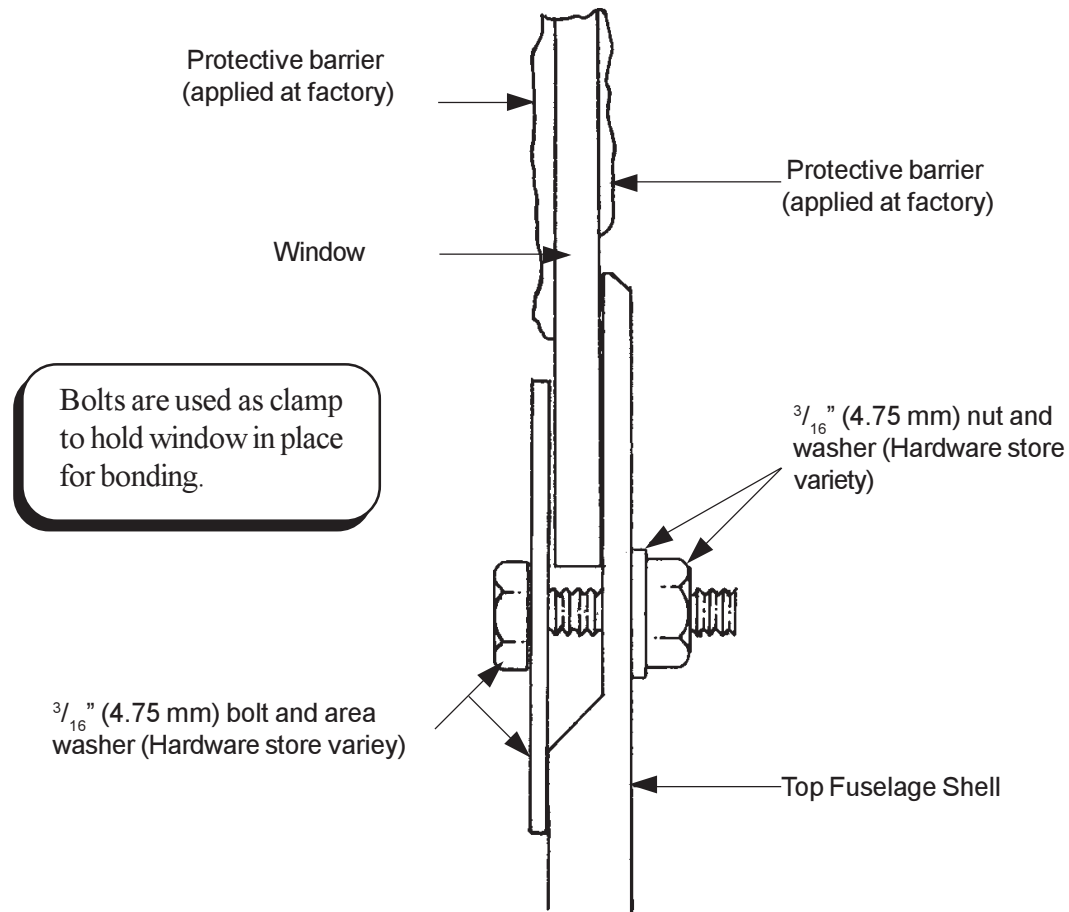


NOTE: The drawings in this chapter will all show one, generic view of a typical window installation. All side windows and windshield are installed similarly, (bonded from the inside of the top fuselage shell).

- B 2.** Carefully locate the windows in the fuselage shell. Use instant glue to bond a few temporary wood locating blocks ( $\frac{1}{2}$ " x  $\frac{1}{2}$ " x  $\frac{1}{2}$ "") to the fuselage. These blocks will hold the windows in place and free up your hands for other work.

### Using Bolts to Clamp Windows in Place

Figure 25:B:2

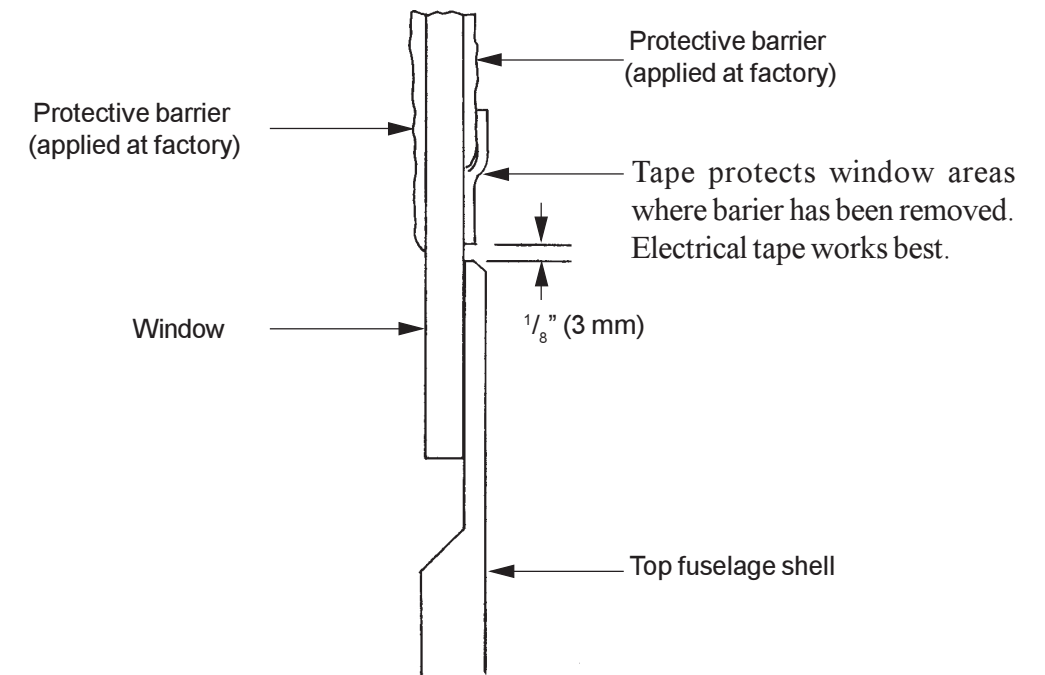


- B 3.** To clamp the window against the fuselage when bonding, use 3/16" (5 mm) diameter bolts (hardware store variety is fine). Drill 3/16" (5 mm) diameter holes every 4" (100 mm) around the parameter of the window. The holes should be centered at about 1/4" (5 mm) away from the edges of the plexiglass. Don't drill through the plexiglass!
- B 4.** Do a trial clamping run with no adhesive to figure out the proper lengths of the bolts. Large area washers should be inserted on the bolts, then the bolts should be inserted through the holes you drilled around the windows. Insert the bolts from the inside. Use small washers and nuts on the outside surface to snug up the bolts. There will be gaps in some areas around the parameters of the windows, especially around the windshields, but these gaps will be filled with adhesive. Because of the differences in ply thickness, it would be impractical to try and get a perfectly even recess around all the windows. Do not grind away fiberglass thickness to get a flusher fitting window!

- B 5.** While you have your windows located, draw a reference line on their outer surfaces showing the edges of the cutouts. You will use this line to trim away the outer protective material from the windows.
- B 6.** Remove the windows from the fuselage shell.
- B 7.** Peel away the protective material from both inner and outer surfaces in their bonding areas as shown in Figure 19:B:3. There should be a 1/2" (12 mm) clear space between material and the bonding areas. Use the reference line you drew in step B5 as a guide for removing the material.

### Protecting Windows From Adhesive

Fig. 25:B:3



- B 8.** Apply a layer of 1/2" (12 mm) wide tape to the outer surface of the windows, covering the narrow clear areas between the protective barrier and the edges of the fuselage cutouts. Electrical tape works well for this job, giving better protection than masking tape. The edge of the tape should be held 1/8" (3 mm) short of the cutout edges. After the windows have been glued in, the tape will be removed leaving a sharp, clean edge around the windows. So treat the tape application carefully and make the corners smooth and round.
- B 9.** Clean the bonding areas of the windows with alcohol. Clean right up to the protective tape.
- B 10.** Use 40 grit to sand the bonding areas of the windows (or if you're very careful, you can use a grinder). Sand thoroughly so no "glossy" areas remain. Be careful while sanding up to the tape edges not to damage the tape. If you do damage the tape, replace it before bonding in the windows.

## C. Window Installation

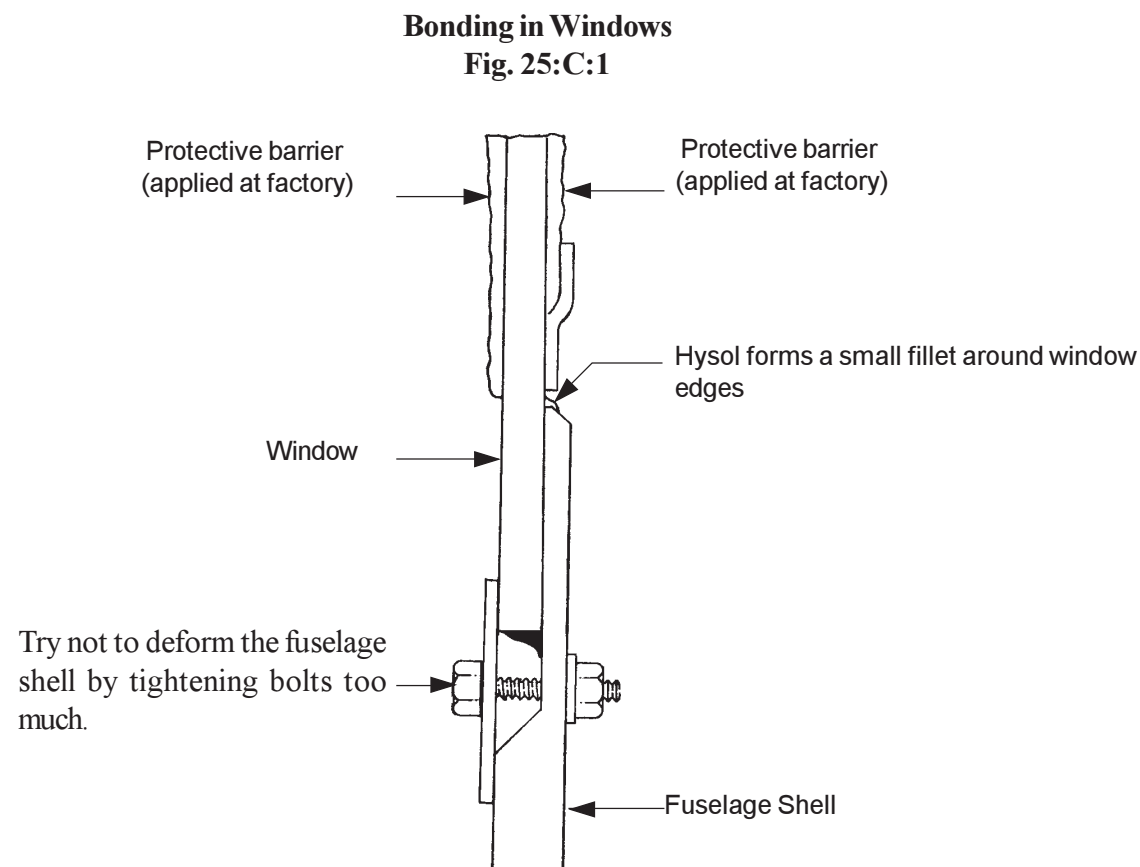
The windows are bonded in position with Hysol structural adhesive. The bond is reinforced with 2 BID from behind.

- C 1. With 40 grit, sand the inner surface of the fuselage shell where the windows will be bonded.
- C 2. Clean all bonding areas with MC. (Except the windows of course).

Note: You don't have to bond both the windows at the same time. If you're alone, best not to push your luck and stick to bonding one or two windows in at a time.

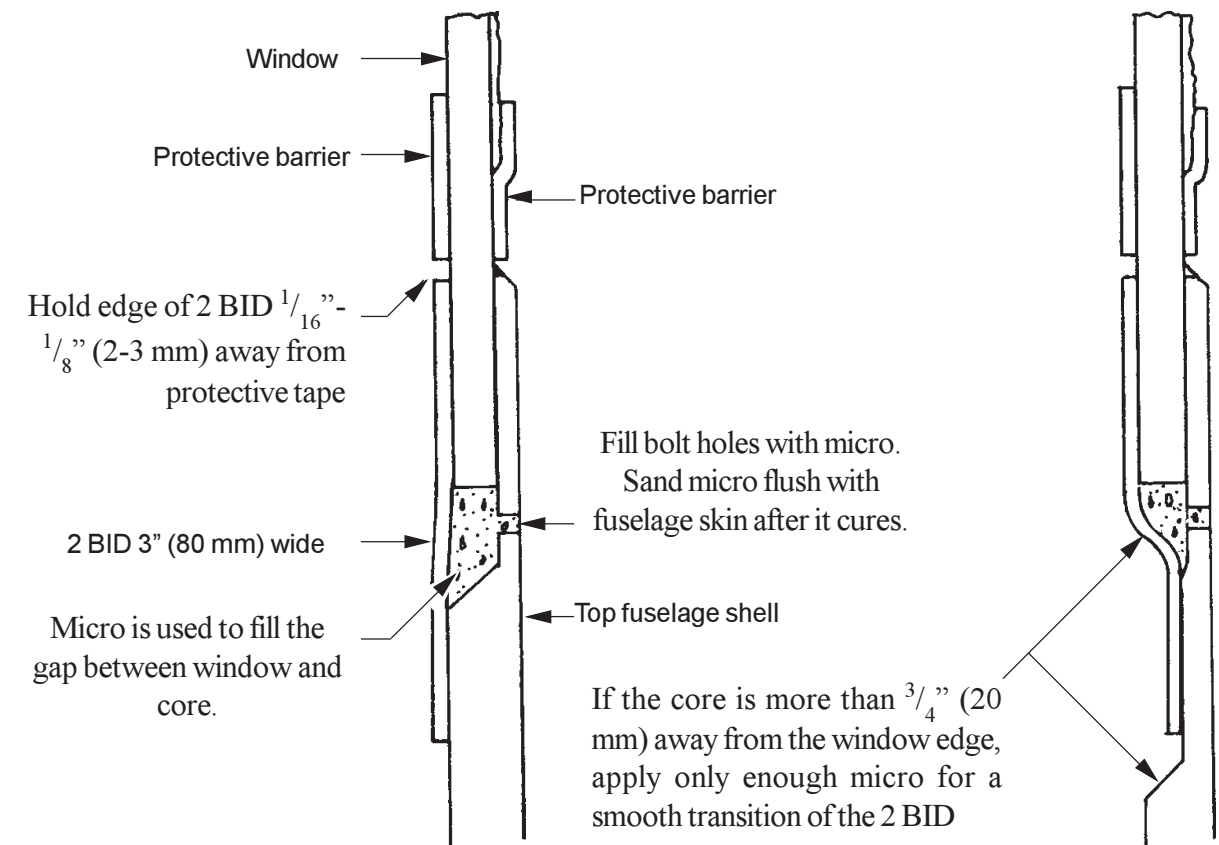
- C 3. Bond the windows to the fuselage with Hysol. A little floc mixed with the hysol helps with the consistency. Snug up the clamping bolts just enough so you can get a squeeze out, but not so that the outer surface of the fuselage is deformed. If there is still Hysol squeeze out but no skin deformation, snug up all the nuts just a bit more and recheck.

Use a modified tongue depressor to scrape away the excess Hysol and form a small radius perimeter of the fuselage cutout. Scrape away enough Hysol so the edge of the tape is visible. Don't let any drips or yucky fingers touch unprotected glass.



- C 4. It is suggested that you leave the window bolted in place until the Hysol has gone through it's full cure time of 5-7 days at room temperature. This will eliminate the possibility of the windows pulling away from the fiber-glass (when this happens, it looks like an air bubble in laminate).
- C 5. Remove the clamping bolts around the windows.
- C 6. With 40 grit, sand inner surface of the windows and the top fuselage shell where the 2 BID reinforcement will be applied. Remember, There should be no glossy surface left in the plexiglass area that will receive the laminates. It is highly suggested that you apply a layer of protective tape to the inner surface of the windows around the perimeter of the fuselage cutouts (just like you did on the outer surface before bonding). This tape will keep wayward epoxy or fiberglass off the clean unprotected surface. Align the edge of the inner tape with the edge of the outer tape.
- C 7. With alcohol, clean the plexiglass where the BID tapes will be applied. Clean the carbon fiber areas of the fuselage with MC.

**Reinforcing Window/Fuselage bond**  
**Fig. 25:C:2**





**C 8.** Fill the areas between the edges of the plexiglass and the fuselage core with a thick epoxy/micro mixture as shown in Figure 10:C:2. If the distance from the edge of the windows to the beginning of the fuselage core is greater than 3/4" (20 mm), filling the entire depression is not necessary, just apply a micro radius around the window edge for a smooth BID transition. This micro will also fill the bolt holes in the fuselage.

Apply 2 BID, 3" (80 mm) wide strips to reinforce the bond between the windows and the fuselage shell. It would be impossible to do these laminates in one piece for each window, so segment the laminates and overlap them onto each other by 1" (25 mm). Using the protective tape as a reference, carefully position the edges of the 2 BID laminates in a straight line, about 1/16" - 1/8" (2-3 mm) away from the edge of the masking tape. Using a gentle touch on the fiberglass, it is fairly easy to get a good straight edge and save yourself some tricky sanding later. Another time saving suggestion is to use peel ply on these laminate for a smooth finish if you later want to simply paint around the windows.

For a nice, finished look to the outer edges of the window cutouts, bevel the edges with a folded piece of 80 grit sandpaper. Of course, you must be very careful not to scratch the unprotected plexiglass. You can also apply a small amount of epoxy/micro around the edges of the windows. The Micro is much easier to sand than Hysol. Another round of applying electrical tape, but it's better protection than nothing.