

10. Wing prep and subassembly



Section Objective: Construct and fabricate the sub-assemblies of the wing panel.

Required Parts: Wing left 11gal PN104-300, Wing right 1gal PN104-400, Wing left 15 gal option PN104-322, Wing right 15 gal option PN104-42, Flap left PN104-500, Flap right PN104-600, fuel caps and collars PN-A30L-CIR, Wing tip left std PN104-112, Wing tip right std PN104-113 ,Wing tip Sport left PN102-212 (optional), Wing tip sport right PN104-213 (optional) Landing Light pockets PN 104-325(optional),

Required Hardware: 12 of #6 nutplates, 24 of 3/32 CS rivets, Oilite flanged bushings 3/8"OD 1/4"ID, Aero-poxy Resin PR2032, Aeroxy Hardener PH3660, fiberglass cloth tape in various widths, Cotton flox,

Required Tools: cutoff wheel, block sander, assorted perma-grit files, rivets squeezer, assorted drill bits.

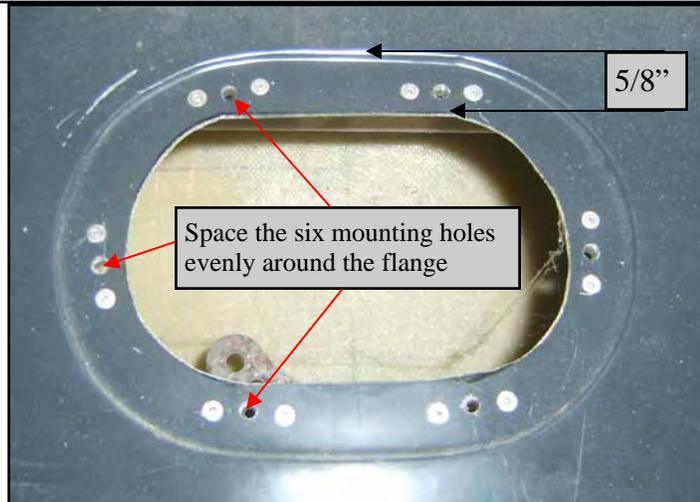
Rulers, squares, 2 3/8" holes saw,

Required Conditions: Temperature above 60F for 24 hours for epoxy layups or bonding.

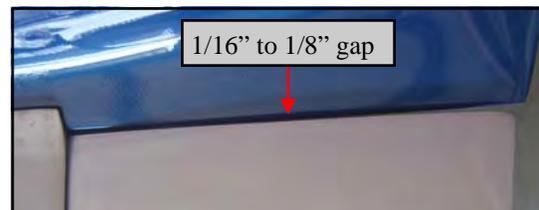
Required Skills and Training: Ability to properly use hand tools, mix 2 part epoxy resins in the proper amounts, lay up fiberglass cloth laminates.

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1. Measure in 5/8" from the joggle in the inspection hole for the wing.
2. Cut out and smooth the corners, you will be sticking your hands in here and won't want to tear them up.
3. Fit the cover to the opening do not drill the holes just get the cover to fit in the opening.
4. Drill pilot holes thru the cover and flange for the nut plate. The only important measurement it to be halfway on the flange.



5. Install a #6 nut plate in each pilot hole, use 3/32" countersunk rivets for a flush fit.
6. The flaps can be mounted on either side of the hinges, but fit best on only one side.
7. Pin in place to decide which side of the hinge gives the smallest gap between the flap and fuselage.



8. Note the side that the hinge in the flap fits on best.
9. Press the bronze bushing in for this side. This will put the flange on the bushing between the wing and flap hinges.



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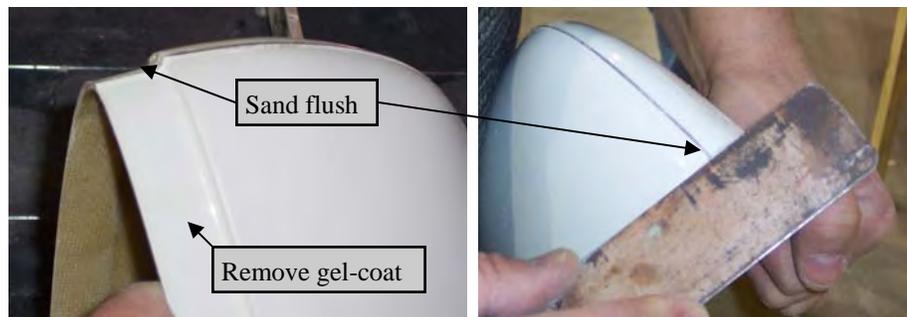
10. Temporarily bolt the flap in place. Rotate the flap into the retracted position.
11. The flap must come up to meet the wing root at the fuselage. If it does not you must trim the trailing edge of the wing so it will, leaving a very small gap between the wing and flap.
12. Clamp a long straight edge to the trailing edge of the wing and block sand it square.
13. Bevel the under side of the wing for a good fit.



Note: It is easiest to fit the wing tips if sections 12 and 13 have been completed. This will provide the best fit and alignment of either set of wing tips.

Standard Wing Tips

14. Clamp the flap to the wing root at the fuselage.
15. Temporarily install the aileron and clamp it to the flap. This will give the correct line to mount the tip to.
16. If **bonding the tips on**, sand the gelcoat off of the mounting flange.
17. Remove any material in the joggle at the leading edge which may cause a seating problem with inside of the wing.

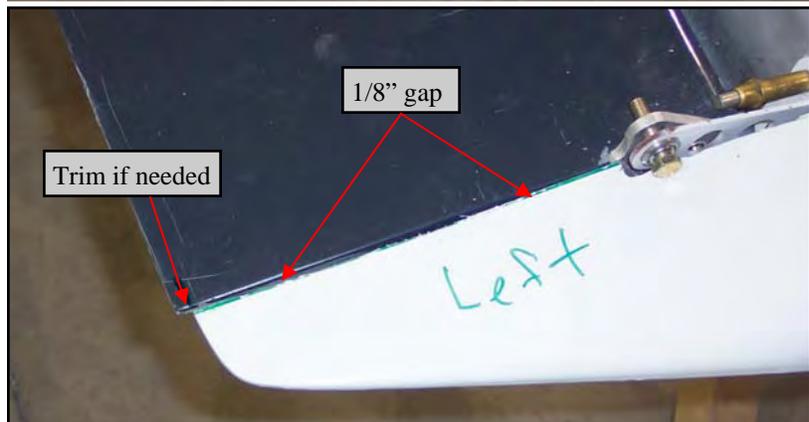
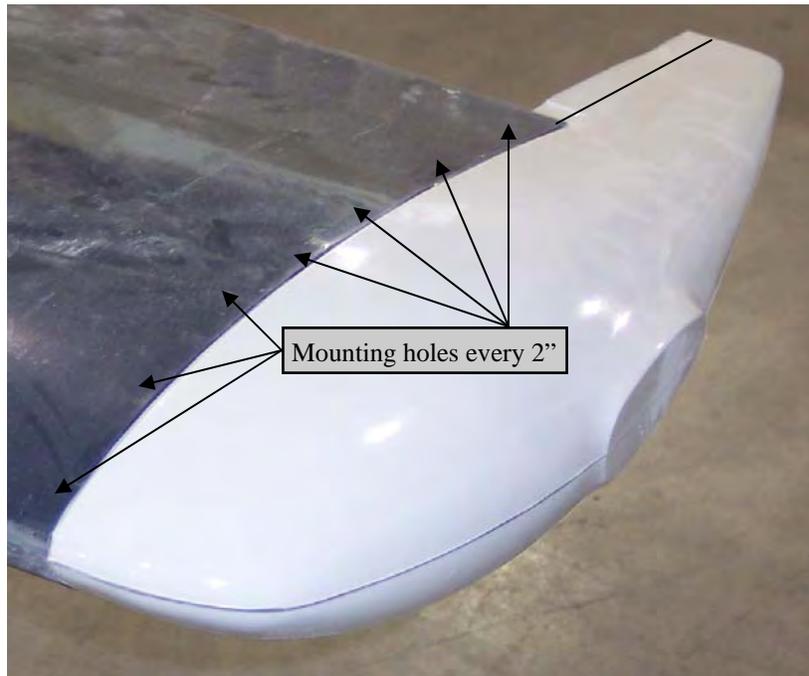
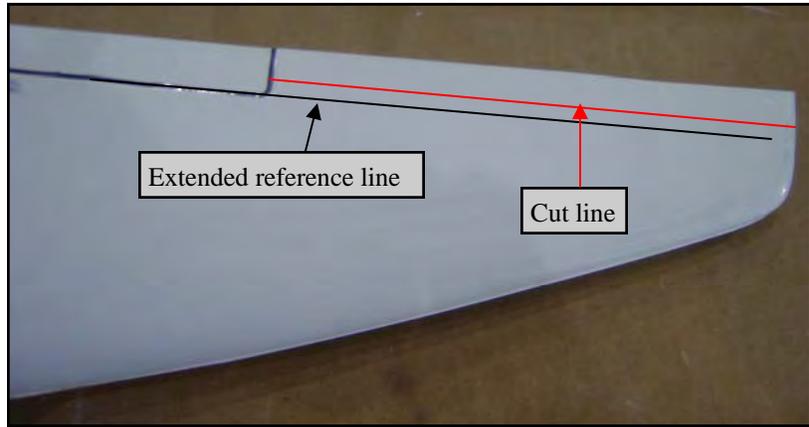


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- 18. Draw an extended line from the joggle to the tip (shown in black).
- 19. Measure over 1/4" and parallel to the first line.
- 20. Cut the top and bottom on these lines.
- 21. It may be needed to trim the joggle some to fit the tip into the end of the wing. Do not trim the width only the length of the flange if needed.
- 22. The tip must slide all the way in so there is no gap between the flange and wing skin end.
- 23. Tape the tip in place and clamp the trailing edge of the tip to the aileron.
- 24. Measure in 1/2" from the wing skin edge and draw a line parallel to it.
- 25. Drill a 3/32" pilot hole every 2" on this line the length of the mounting flange on the top and bottom. Install a cleco as you go so it won't move.
- 26. With the tip firmly in place open the gap up between the tip and aileron to 1/8", no smaller.
- 27. Also it may be needed to clearance the tip for the outboard hinge and the washer which will capture the hinge bearing.
- 28. The aileron can be trimmed up to 1/8" if needed
- 29. Remove the aileron when happy with all the clearances.



30. Use the provided 1/2" thick fiberglass sheet to fabricate a close out rib for the tip.



31. Remove the tip and glue in the close out rib with epoxy and floc. Remember to sand up the inside of the wing tip for a good bonding key and pre wet both surfaces with epoxy before putting the floc mixture in place.

32. Re-install the tip with the clecos and clearance the rib for the hinge and related hardware.

33. If using **screws and nut-plates to hold the tip on**; Install these at each of the pilot holes you drilled earlier. Hardware for this is not included but we suggest #6 hardware.

34. If bonding the tips on; The mounting flange must have all gel-coat removed. The inside of the wing should be sanded as well to provides a good bonding key. Wet out both surfaces with epoxy, than place a good amount of epoxy floc mix on the joint. Slide the tip into the wing and use small self tapping sheet screws to hold the tip on until dry.

Wing Tip Extension for Sport Lightning

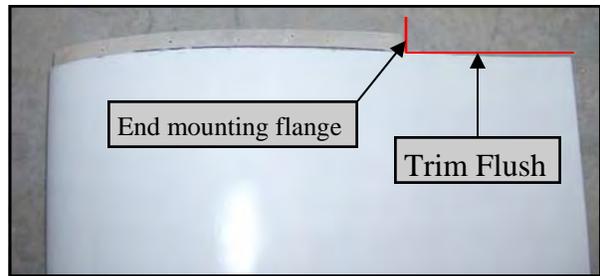
Note: The wing tip extension installation is similar in technique however because they are a load bearing surface care must be taken when installing them. These can be bonded on or installed with nut-plates and screws, each installation process is different so read carefully.



1. Continue the molded mounting flange to the trailing edge with a marker on the top and bottom.

2. Cut on this line up to the mounting flange and then over where the flange stops.

3. Do not remove the gel-coat from the flange at this time.



4. Raise the flaps and clamp them to the wing root a the fuselage.

5. Clamp the aileron to the flap to keep the trailing edge in line.



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6. Draw a line parallel to and 1/2" in from the end of the wing skin.
7. Measure forward of the rear spar 1" make mark and then a mark every 1.5" from there. This is the same for both bonded and screwed on wing tips. The bottom is the same.



8. Use the photo below as a reference for setting up some items that will help fitting the wing tip. Items need are: 2 foot piece of scrap angle aluminum. At least a 4 foot piece of scrap angle aluminum, weighted bag (shot works), clamps and clecos.

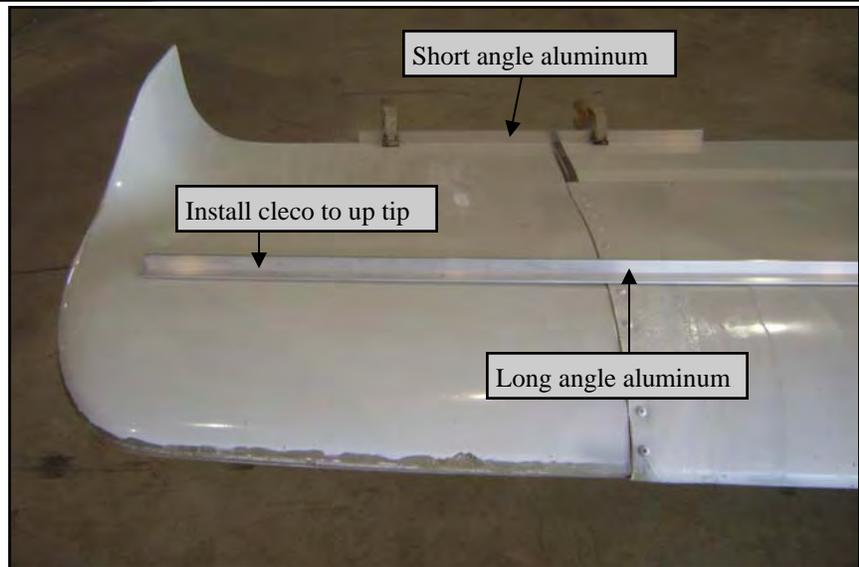


9. Slide the wing tip in place and clamp the trailing edge to the angle aluminum.

10. Drill a 3/32" hole thru the long aluminum on the top of the wing and into the tip, put a cleco here. This will hold the tip up and insure that the top of the tip is flush with the wing

11. Drill a 3/32" hole at every mark on the

wing skin and install a cleco as you go.



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12. Remove the aileron and fabricate from scrap fiberglass board a close out rib for the tip.



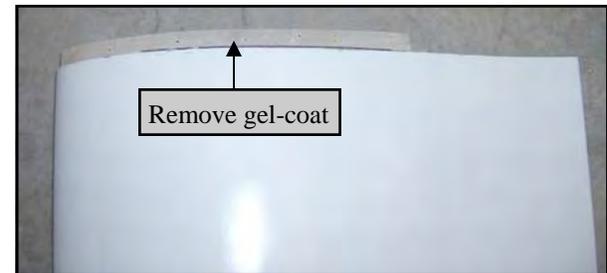
13. Sand the inside of the tip and glue the rib in place with epoxy and flox.
 14. The close out rib will have to be clearance for the hinge and related hardware.
 15. **If making your wing tips removable you must** put 3 layers of 3" wide 8oz glass on the inside of the end of the wing to stiffen the skins at the end.
 16. Sand this area for a good bonding key and lay up the glass top and bottom.



17. Let cure.
 18. Install #8 nut-plates into the mounting holes in the flange of the wing tip. Not supplied.
 19. Drill the holes in the end of the wing skin to 5/32"
 20. The tips can now be mounted with pan head (wide head) #8 screws. Not supplied.

If installing the tips permanently.

21. The tips should be fitted already as described starting on page 4 #1-14.
 22. Remove the gel-coat from the mounting flange on the wing tip, take care and do not be aggressive with the sander.
 23. Sand the inside of the wing where the tip will join.
 24. Mix up about 3oz of 24hr epoxy to start.
 25. Wet out the contact areas of both parts
 26. Mix the rest of the epoxy with flox.
 27. Put a good pile of flox on the wing tip join flanges.
 28. Slide the tip into place.
 29. Screw the tip on with #6 or #8 sheet screws in the original pre-fit holes.
 30. Let cure. **You are not done yet!**



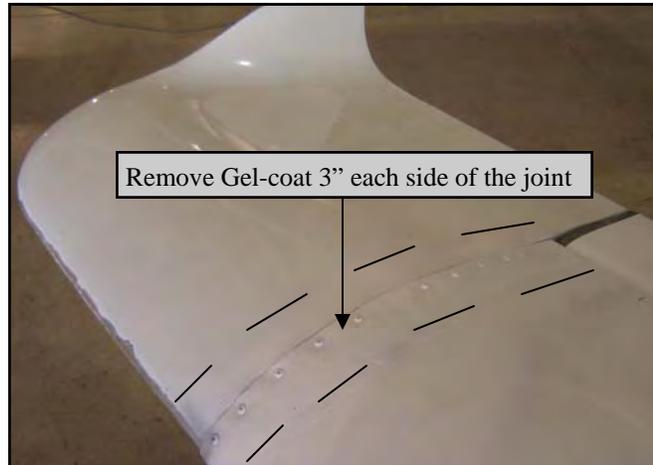
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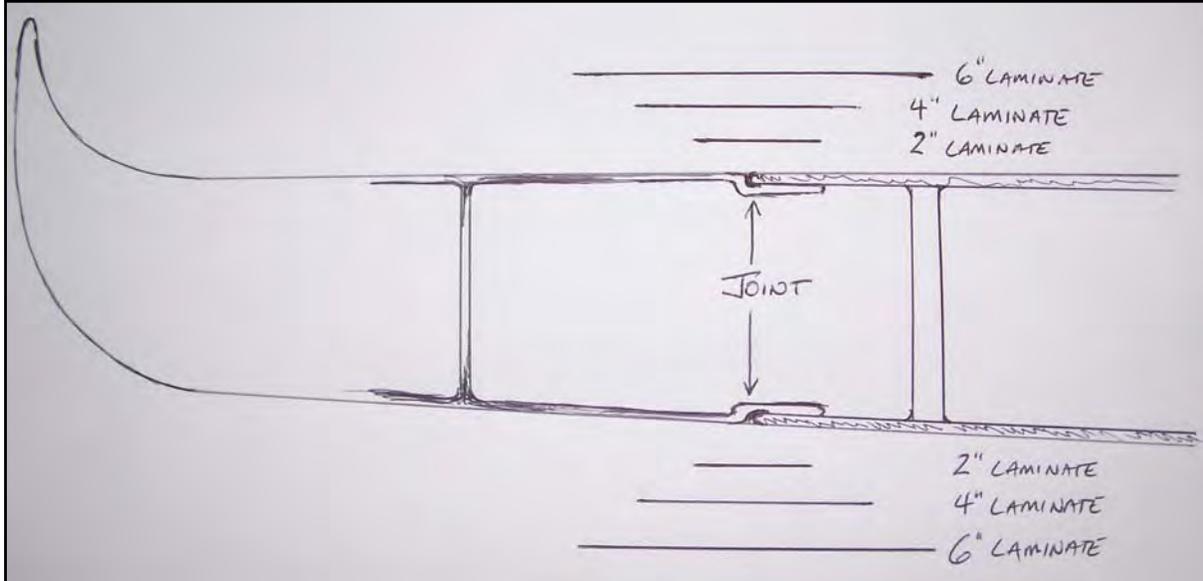


31. When cured for at least 24 hours remove the screws. If they do not want to come out heat them up with a soldering iron for a few seconds, this softens the glue on them and make removal easier.
32. Sand off the gel-coat 3" each side of the joint, should give a 6" wide area, do this top and bottom.

**Do not sand thru the Glass
Only remove the gel-coat!**



33. From 8oz glass cut 2 sets (left and right) of the following strips: 6" by 23", 6" by 21", 4" by 23", 4" by 21", 2" by 23", 2" by 21". The 23" lengths are for the top laminate and the 21" are for the bottom skin laminate.
34. Mix about 3oz of 24hour epoxy to start. Wet out the areas where the glass is to be laid. If only laying up the top first and than the bottom the next day only wet the top side. It is possible to lay up both at the same time although the tricky part is getting the bottom layers to stay in place up side down.
35. The lay-up should be done as shown in the diagram below, starting with the 2" than the 4" than the 6" wide strips.



36. You may choose to put a layer of peel ply over the glass to give a better finish for less body work later, this is available from aircraft spruce.
37. Finish the top and bottom the same manner.
38. Repeat for the other side.

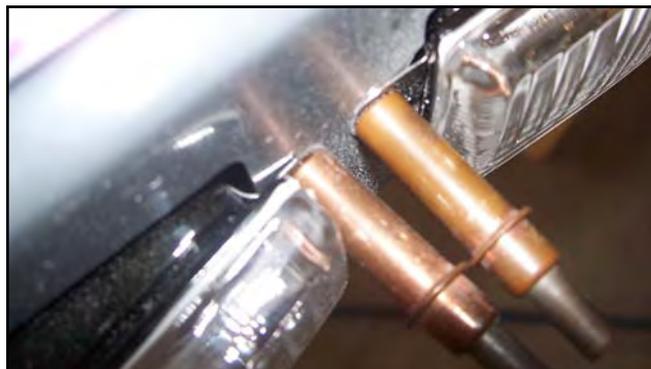
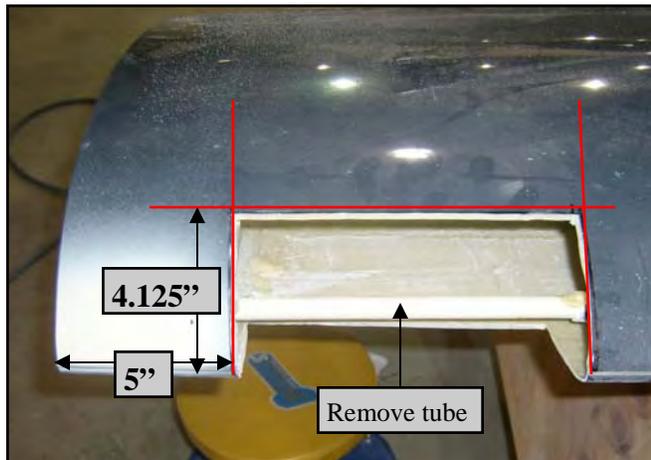
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Landing Light installation for single light pocket

1. Measure in 5" from the end of the wing skin and draw a line that parallels the end skin back on the wing 8" or so on the top and bottom.
2. Measure over from this line 9.125" and make another line parallel to the last one. The pocket will not fit between these marks but is very close and will allow you to open it up to perfect fit.
3. Measure back on each line 4.125" this will be the back cut.
4. Make the same marks on the bottom of the wing.
5. Cut the leading edge out on these marks.
6. Remove the PVC tube from this section of the wing as the pocket will not fit.
7. Carefully sand the opening until the pocket fits flush.
8. Remove the gel coat from the outside flange of the pocket and with in 1" all the way around the opening.
9. Strip the light pocket in with a 1" wide strip of 8oz glass.
10. When dry, cut out a hole centered in the pocket the same size as the light.
11. You will have to make a 1/4" relief in the sides of the hole for the mounting bracket for the light.
12. Fabricate from scrap stainless 3/4" wide by 1.5" long strap.
13. This is bent over 90 but not in the middle it will be a little longer on the end in the pocket.
14. Install a # 8 nutplate in this place and install with a screw.
15. Reference the picture at right.
16. Install the cover with small sheet screws, or nut-plates before pocket install which ever is preferred.



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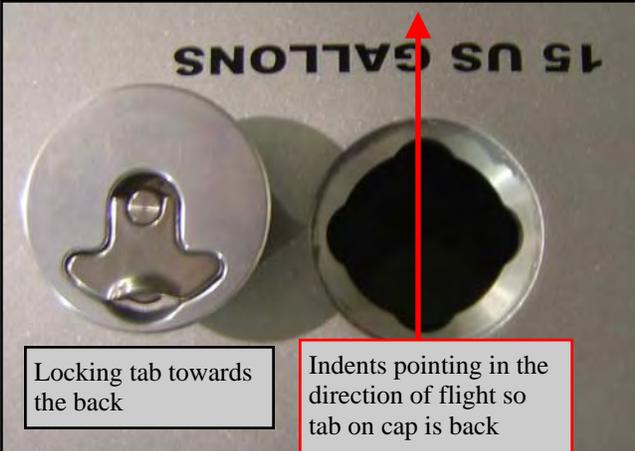


Fuel filler cap and collar installation

Required items: Filler caps and collars, 2.5" hole saw, 24 hour epoxy, flox.

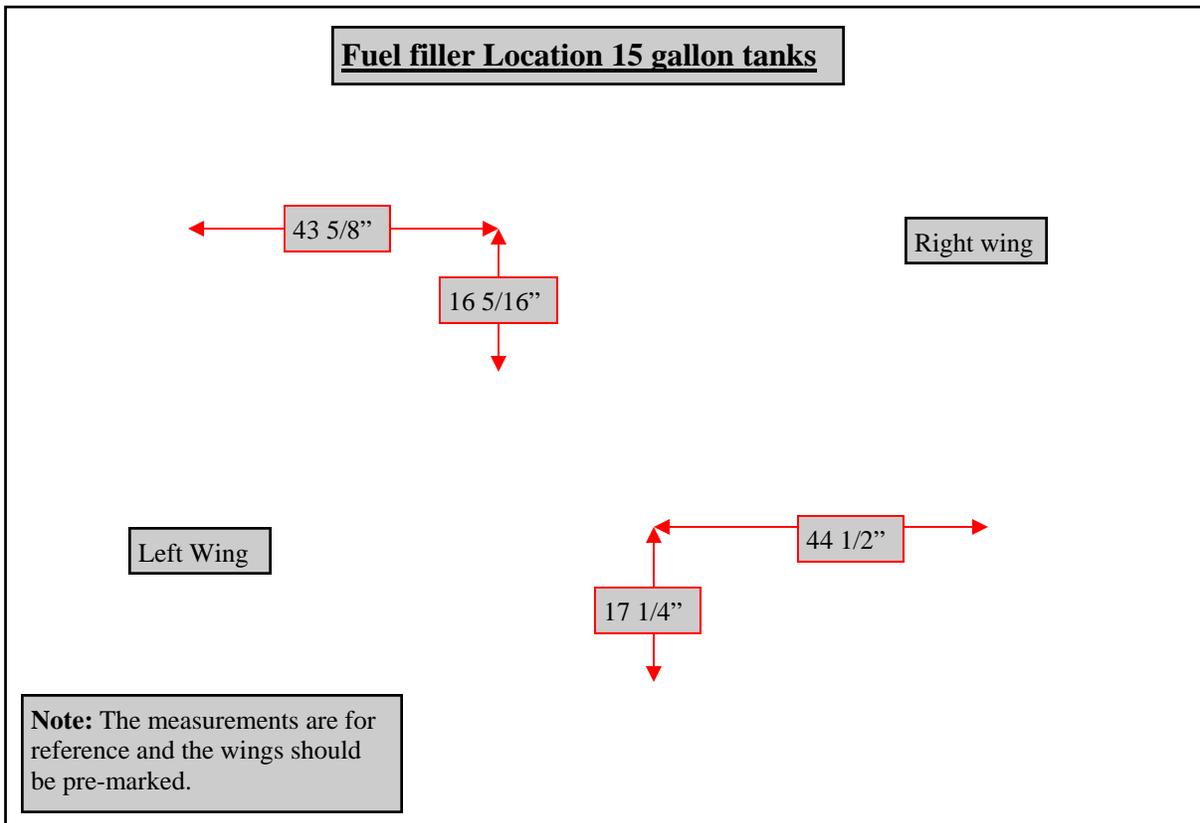
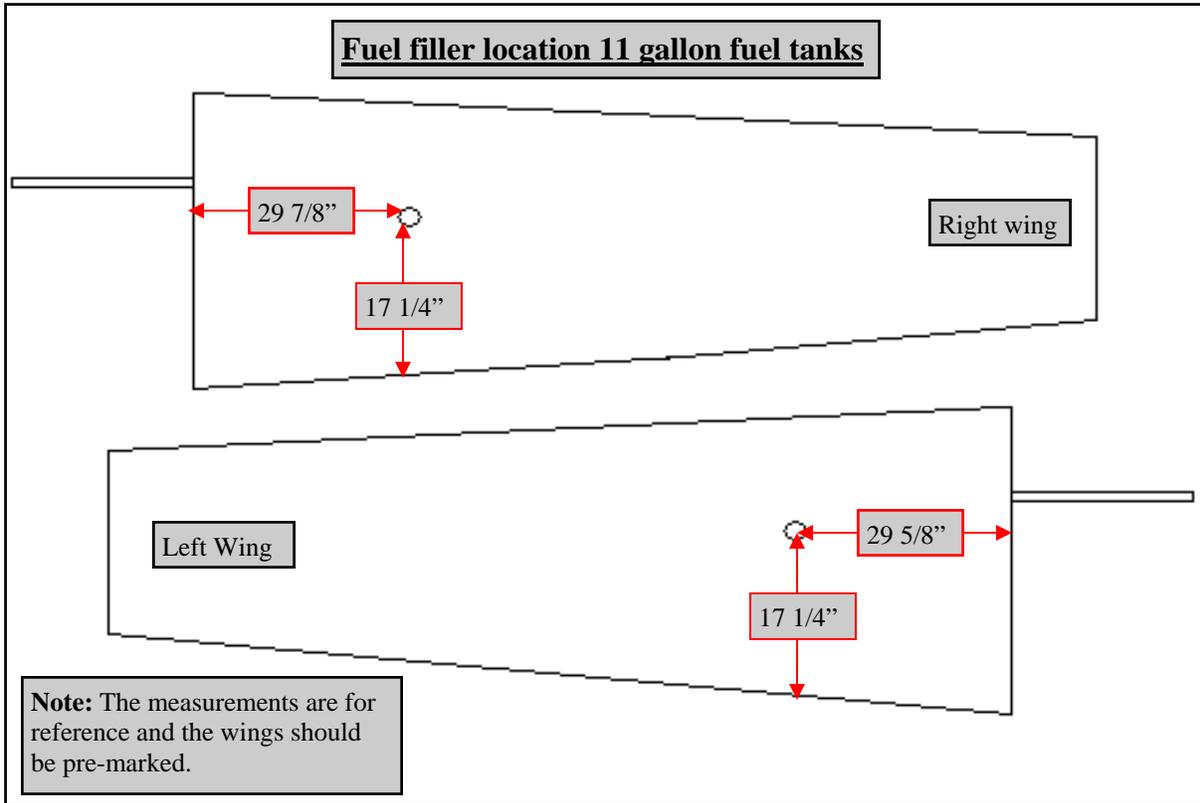
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Note: this is a general assembly for either cap and is universal for all tank options and both wings.



1. Locate the fuel filler collar and cap assembly.
2. Check the measurement of the collar flange which will fit in the tank, it should be 2.5"
3. Verify the predrilled hole in the wing skin for the filler location. Use the drawing on the next page to do so. Make sure that you are checking for the fuel tanks you have ie, 15 gallon or 11 gallon tanks.
4. Using a 2.5" hole saw drill thru the wing skin and top of the tank.
5. Sand away an rough edges but do not open the hole any further.
6. Using a palm sander or similar toll remove the gelcoat with in 1/2" of the hole, do not cut glass just sand off the gelcoat.
7. Vacuum up any debris or dust and clean the area around the cap with acetone.
8. Sand the bottom of the collar flange which will contact the wing skin with course sandpaper.
9. Mix up about 1.2oz epoxy per fuel cap to bond in. Mix most of this with flox and leave a small amount for wetting out the contact areas.
10. Wet out the areas on the wing skin and fuel collar and collar flange.
11. **Important:** It is possible that there will be a gap between the top of the tank and the bottom of the wing skin. If so fill this void with epoxy flox mixture before installing the collar.
12. Put a fillet of epoxy flox on the collar flange extending down onto the flange.
13. Push the cap down into the hole until it seats and becomes fairly flush with the wing.
14. Make sure that the half round indents in the collar are inline with the direction of flight.
15. Clean up any excess glue on the wing or the collar, especially the inside of the collar where the cap goes.
16. Wait 24 hours to dry.
17. When dry flip the wing up side down and mix up about 1.2 oz of glue total for both wings.
18. Use the drawing on the next page as a reference to build an epoxy flox flange on the inside of the tank to fully seal the collar.

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Fuel filler installation cut-away

