The fuel vent float valves protect against fuel spillage when the airplane is parked on uneven ground. The installation described in these instructions is intended primarily for the Glasair II-S and the Glasair III, but, using similar techniques, it may be adapted for use on earlier models of the Glasair.

The fuel vent float valve is designed to be installed on the outboard surface of rib "I", forward of the main spar shearweb. An internal float, which rises as fuel enters the valve body through a 3/8" tube located at its base, seals off the fuel vent to prevent fuel from spilling overboard. A pressure relief valve prevents damage to the fuel tank that might result from fuel expansion due to a temperature change. If cold temperatures freeze the valve, or if any other condition (full tip extension tanks, for example) keeps the valve in the closed position, a check valve opens to allow the engine to pull fuel from the tank. With most standard installations, however, the main tank is also vented to the header tank, which is vented overboard, so that the check valve feature will not be activated. Both the check valve and the pressure relief valve are located in the upper housing of the fuel valve.

The float valve also functions as an aerobatic valve for inverted (negative g) flight. The float is actually an inverted cup that traps air inside to act as a float. When flying inverted, the cup fills with fuel and the weight of the fuel closes the valve to prevent fuel from spilling out the vents.

To install the float valves in conjunction with the Vision Microsystem fuel gauge system, locate the fuel probes about 3" forward of the main spar shearweb to provide space for mounting the valves. If you have already installed your fuel probes, we are working on a simple way to remotely mount the valves. Instead of mounting the valves on rib "I", as described below, one solution might be to mount them on the "J" ribs aft of the spar shearweb, and to use flexible tubing from the valve inlet and outlet tubes to some additional tubes bonded into the main spar shearweb inboard of rib "J". An access hole would have to be fabricated in either the aft portion of the "J" rib or the lower wing panel. Contact us if you have already installed your fuel probes and need help with an alternative installation.

FUEL VENT FLOAT VALVE INSTALLATION

STEP 1 REMOVE THE ORIGINAL FUEL TANK VENT LINE

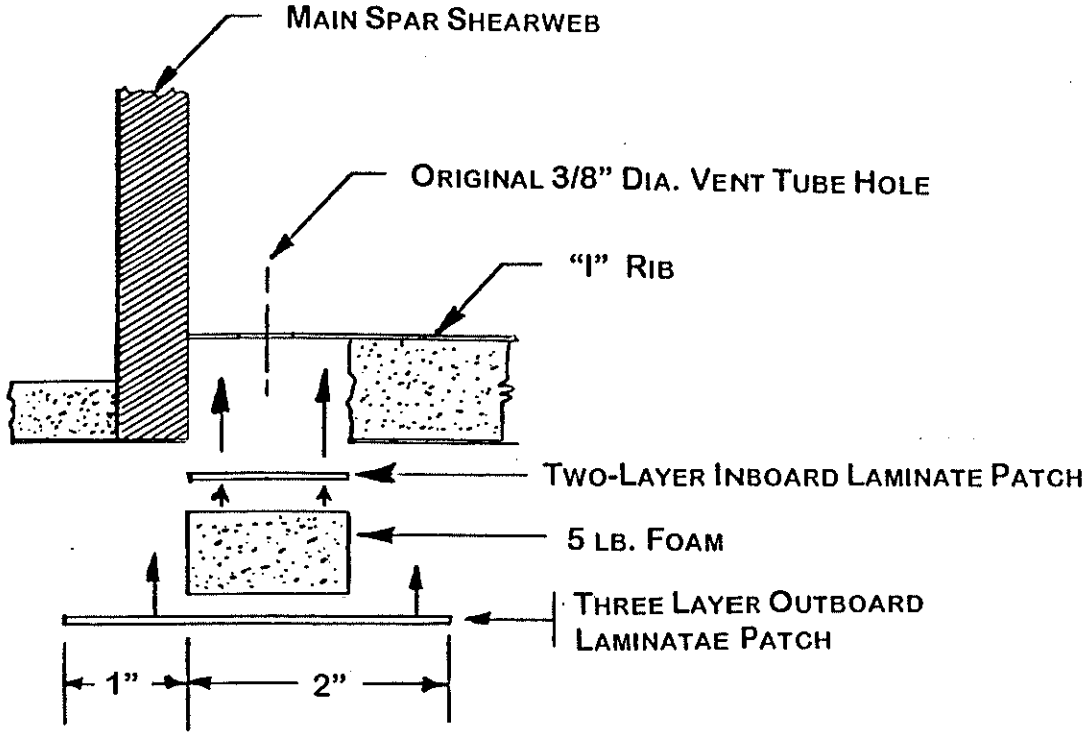


FIGURE (1)

The Wing Assembly section of the Instruction Manuals describes a main fuel tank vent that passes through the fuel tank end rib (rib "I") just below the upper spar cap and just forward of the main spar shearweb. If you have already installed this vent, it must be removed before the vent float valve can be installed.

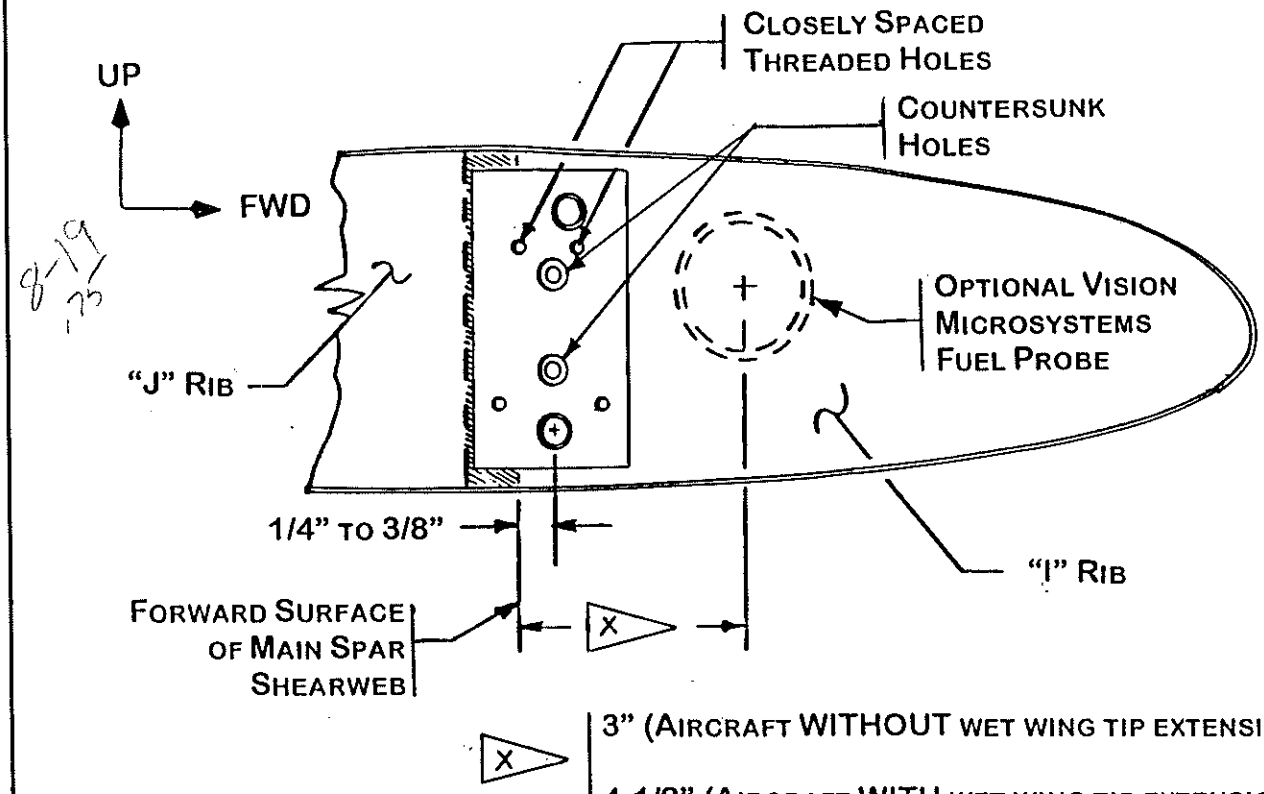
Use a small rotary file in a die grinder or the equivalent to grind away the mill-fiber bonding mixture from around the vent tube. Work the vent tube loose, and remove it. Clean up any remaining mill-fiber bonding mixture in the cavity.

Patch the hole in the inboard laminates of rib "I" inside the cavity by applying a two-layer bidirectional laminate over the hole, as shown in FIGURE (1). (If the wing has not been closed yet, these laminates can be applied on the inboard surface of rib "I".)

NOTE: As with all other laminates that come in contact with fuel, make the laminates extra wet or resin-rich to prevent leaks.

Next, cut a small block of 1" thick 5 lb. foam to fit the cavity, and bond it into the cavity with a thick Q-cell mixture. Finally, apply a three-layer bidirectional laminate over the foam insert on the outboard side of rib "I". To provide a flat surface for installing the float valve mounting plate, extend the outboard laminates for 1" aft and 2" forward of the forward surface of the main spar shearweb, and from the upper wing panel to the lower wing panel.

STEP 2 DRILL THE FLOAT VALVE PASS-THROUGH HOLES



NOTE: LOCATIONS BETWEEN 3" AND 4-1/2" MAY ALLOW THE FUEL PROBE TO TRAVEL UNDER THE WING FUEL FILLER CAP. THIS CAN CAUSE INTERFERENCE WITH A FUEL NOZZLE WHILE SERVICING THE AIRCRAFT WITH FUEL.

RIGHT WING SHOWN
LEFT WING IS MIRROR IMAGE

FIGURE (2)

The float valve mounting plates are fabricated as left hand (552-0494-001) and right hand (552-0494-002) parts that are mirror images of each other. They are bonded to the outboard surface of the fuel tank end rib (rib "I") with the two 3/8" aluminum tubes passing through the rib. The upper tube on each mounting plate is offset toward the leading edge of the wing.

NOTE: There are four small threaded holes in each mounting plate. The two holes that are spaced most closely together are near the **upper** end of the mounting plate.

Hold the float valve mounting plate against the outboard surface of rib "I" with the two aluminum tubes oriented inboard and the two closely spaced threaded holes oriented upward. Center the **lower** tube between 1/4" and 3/8" forward of the forward surface of the main spar shearweb, as shown in FIGURE (2). Use a pencil (modified to fit) inserted through the tubes to mark both tube locations on the outboard surface of rib "I".

NOTE: It may be easier to use the opposite side mounting plate with the aluminum tubes oriented outboard for marking the hole locations.

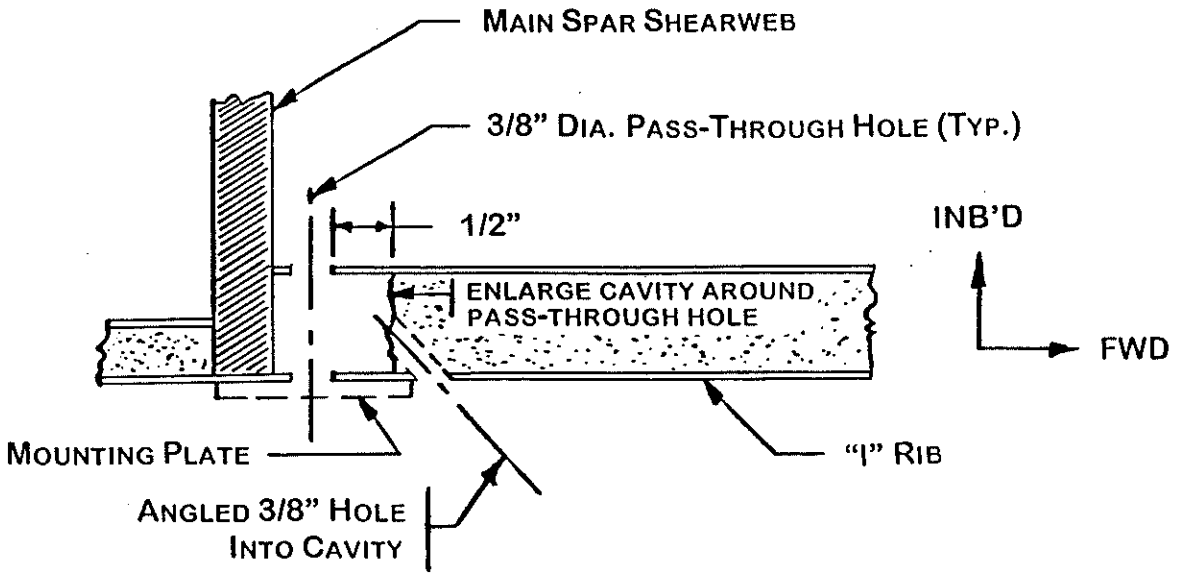
NOTE: For wings that have already been closed, the end of the main spar shearweb should be visible when viewed from the end of the wing.

Using the marks just made, drill two 3/8" diameter holes through rib "I".

NOTE: While drilling the holes in the end rib, use a vacuum cleaner nozzle inserted through the fuel cap to the inside of the tank to catch any debris. After drilling the holes, thoroughly clean the fuel tank of any debris that might have fallen into the tank.

CAUTION: If the fuel tank has had fuel in it, DO NOT USE AN ELECTRIC POWERED DRILL OR VACUUM CLEANER. Sparks from the tool could ignite fuel vapor. Use air powered tools, instead.

STEP 3 PREPARE FOR BONDING THE FLOAT VALVE MOUNTING PLATE



PLAN VIEW

FIGURE (3)

Using a bent nail foam router tool (described in the Fabrication Techniques section of the Instruction Manuals) or the equivalent, remove the foam core between the inner and outer "I" rib laminates, extending about 1/2" around the hole where possible, as shown in FIGURE (3). This forms a cavity for the mill-fiber bonding mixture. Carefully scrape all foam and Q-cell residue from the exposed inboard laminates in the cavities to provide a good, fuel-tight bond.

Place the mounting plate in position on rib "I", inserting the tubes through the holes in the rib. Mark the forward edge of the mounting plate onto the rib. Using a 3/8" bit, drill a hole at an angle from the forward side of the mounting plate location into each cavity. These angled holes will allow mill-fiber mixture to be injected into the cavities around the tubes after the mounting plates are in place.
Using coarse sandpaper (36 grit), roughen the inboard surface of the mounting plate and the two 3/8" aluminum pass-through tubes to provide better adhesion for the resin bonding mixture. Clean the sanded areas with acetone.

Wrap the two tubes on each mounting plate with three or four layers of bidirectional cloth, and let cure.
Relieve the holes drilled through the "I" rib enough to allow the pass-through tubes, with the additional thickness of the bidirectional laminates, to be inserted into them. The mounting plate must fit flush against the outboard surface of the "I" rib.

To prevent resin contamination, pack all of the small threaded holes in the mounting plate with modeling clay. Clean all bonding surfaces with acetone.

STEP 4 BOND THE MOUNTING PLATES

8-19.1.0

Mix a wet mill-fiber/resin mixture, adding Cabosil to the mixture, if desired, to smooth it out. Pre-pack the cavities in rib "I" with the mill-fiber mixture, using dowels inserted through the holes to leave space for insertion of the mounting plate tubes. Make sure to leave enough space that the tubes can be inserted without getting mill-fiber mixture in them.

Also, apply some of the mill-fiber mixture to the inboard face of the mounting plate where it contacts rib "I". Remove the dowels and insert the mounting plate tubes through the holes in the rib until the mounting plate bottoms against the outboard surface of the rib. Drill two 1/8" holes through the outboard rib "I" laminates only, centered on the two large countersunk holes in the mounting plate. Secure the mounting plate to rib "I" with the countersunk NAS548-8-10 self-tapping screws. Using a caulking gun or a large syringe, squeeze mill-fiber mixture into the cavities through the angled access holes. Use a small stick to work the mill-fiber mixture around inside the cavities to make sure that all voids are filled. Be sure to completely fill the cavities. Apply light pressure against the mounting plates, and let the mill-fiber mixture cure.

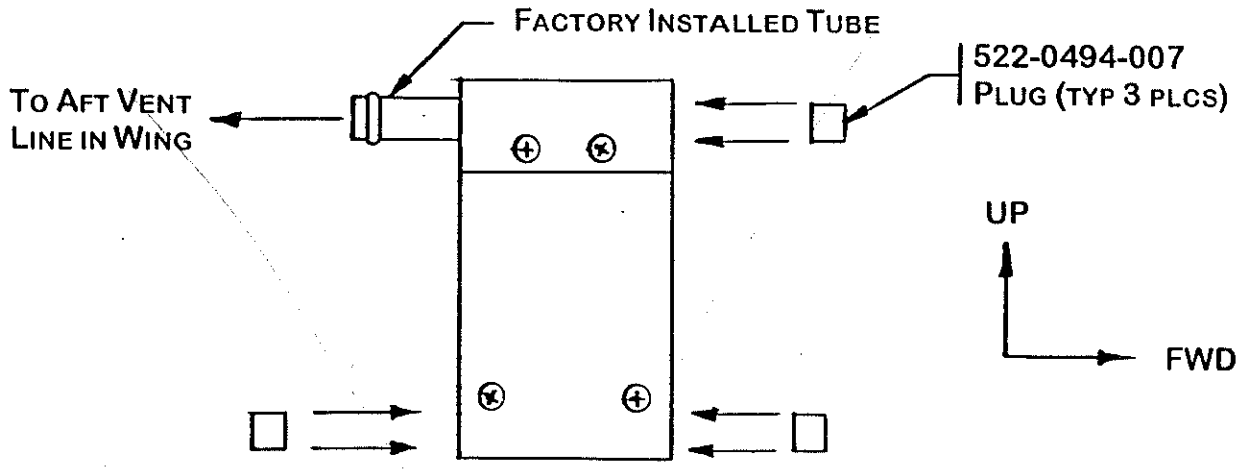
STEP 5 ASSEMBLE THE FLOAT VALVE

8-19-00 3.5 Change from hose clamps to AN fittings

Remove the modeling clay that was placed in the small threaded holes in the mounting plates.

Using a 6-32 screw cutter (usually found on a multipurpose wire crimping tool), trim the AN507-6R32 mounting screws to a length of 1-15/16". When trimmed to this length and inserted through the float valve body, the screws will protrude 3/16" past the inboard surface of the valve.

The float valve assemblies come with 3/8" diameter stainless steel tubes installed in their upper, aft sides. Like the mounting plates, the float valve assemblies are left hand (332-0490-101) and right hand (332-0490-102) parts that are mirror images of each other. There are two 3/8" diameter holes in the forward side of each float valve body and one 3/8" diameter hole in the aft side, below the already-installed tube.



R.H. SHOWN

FIGURE (4)

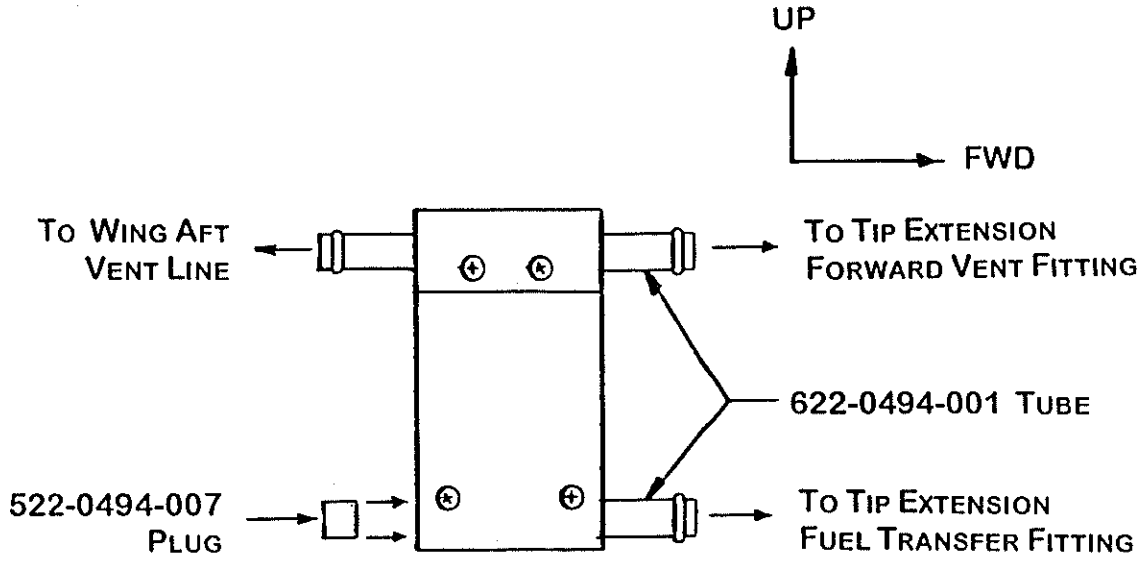
For airplanes without wing tip extension fuel tanks, the two holes on the forward side of the float valve body and the single hole on the aft side must be plugged, as shown in FIGURE (4). To install the plugs, apply a drop of Loctite RC/680 to each plug (522-0494-007) and press it in until it is flush with the outside of the check valve body. Be careful to start the plugs straight.

Make sure that the 620-0568-110 O-rings are properly installed in the counterbores on the inboard surface of the float valve body. Apply a drop of Loctite thread adhesive (RC/222) to the first 3/16" of the threads at the tip of each of the AN507-6R32 screws, and use the screws to secure the float valve body to the mounting plate. Mark the screws with witness paint (available from the Glasair Options Catalog).

CAUTION: Do not over-torque the screws as they are threaded into the aluminum mounting plate.

Connect the aft vent line in the wing to the tube in the float valve as described in Step 6 on page 8.

Airplanes with wing tip extension fuel tanks



NORMAL CONFIGURATION
(OPTIONALLY, SWAP POSITIONS OF PLUG AND FUEL TRANSFER FITTING TUBE)

R.H. SHOWN

FIGURE (5)

If you are using wing tip extension fuel tanks, the normal configuration is to connect the fuel transfer fitting in the tip extension to the lower, forward hole in the float valve body, as shown in FIGURE (5). (The fuel transfer fitting in the tip extension is the single fitting at the lower side of the tip extension.) Optionally, the fuel transfer fitting can be connected to the lower, aft hole of the float valve. The forward vent fitting in the tip extension is connected to the upper, forward hole in the float valve body. The remaining hole in the float valve body is plugged.

Determine whether you wish to connect the tip extension fuel transfer tube to the lower forward or the lower aft hole in the float valve. Apply a drop of Loctite RC/680 to one of the stainless steel tubes (622-0496-001), and press it into the chosen hole to a depth of 1/4". Using similar procedures, install a stainless steel tube into the upper forward hole in the float valve body. Plug the remaining hole in each float valve body by applying a drop of Loctite RC/680 to the plug (522-0494-007) and pressing it into the hole until it is flush with the surface of the valve body.

Make sure that the O-rings are properly installed in the counterbores on the inboard surface of the float valve body. Apply a drop of Loctite thread adhesive (RC/222) to the first 3/16" of the threads at the tip of each of the AN507-6R32 screws, and use the screws to secure the float valve body to the mounting plate. Mark the screws with witness paint (available from the Glasair Options Catalog).

CAUTION: Do not over-torque the screws as they are threaded into the aluminum mounting plate.

Connect the aft vent line in the wing to the upper aft tube in the float valve as described in Step 6 below. Complete the other tubing connections between the float valve and the fittings in the tip extension as described in Step 7.

STEP 6 CONNECT THE WING AFT VENT LINE TO THE FLOAT VALVE VENT TUBE

To connect the aft vent line in the wing to the upper, aft tube in the float valve body, you have two options:

The first option is to thread an AN841-6D hose nipple fitting into the flared end of the aft vent line in the wing. Then, connect the AN841-6D fitting to the upper aft tube in the float valve using a short length of 830-0045-001 flexible fuel line and two 450-0190-004 screw clamps. This is the easiest option if you have already fabricated the aft vent line with a flared end and have already installed the vent line in the wing.

Alternatively, you can bead the forward end of the aft vent line in the wing, and connect it directly to the upper aft tube in the float valve, dispensing with the AN841-6D fitting. Again, make the connection using a short length of 830-0045-001 flexible fuel line and two 450-0190-004 screw clamps. This option requires the use of a special beading tool, which possibly could be borrowed from a mechanic at a local FBO.

STEP 7 CONNECT THE FLOAT VALVE TO THE TIP EXTENSION FUEL AND VENT LINES

If you have the tip extension fuel tanks, connect the fuel transfer fitting in the wing tip extension (the single lower fitting) to the lower tube in the float valve body (installed in either the forward or aft side, as determined in Step 4). Connect the forward vent line fitting in the wing tip extension to the forward upper tube in the float valve body. Make both connections using short lengths of 830-0045-001 flexible fuel line and two 450-0190-004 screw clamps per connection.

NOTE: The aft vent fitting (cross-over vent) in the wing tip extension is not used. Plug the fitting by connecting a short length of the flexible fuel line tubing to the fitting and inserting a plug (a short length of 3/8" rod) into the other end of the tubing. Use the small screw clamps as before to secure the tubing at both the fitting end and the plug end. When the plane is flown without the tip extension fuel tanks, use similar procedures to plug the two unused fittings in the float valve body.

STEP 8 CHECK THE SYSTEM FOR LEAKS

Seal off the vent lines and perform a fuel tank pressure test, or fill the tank with fuel to check for leaks.