

Service Bulletin 53

Subject: Welded Aluminum Fuel Tank Inspection for Pinhole Leaks

Applicability: Fuel Tanks Delivered After 4/12/05 and before 2/06/06 on both Sportsman and GlaStar Aircraft

Compliance Time: Before First Flight, with Exceptions

Discussion and Background Information:


Glasair Aviation LLC has recently discovered some fuel tanks that were released into production which had some minor pinhole leaks stemming from porosity of the welds. These pinhole occlusions are virtually invisible to the untrained eye and will only reveal themselves during a post weld inspection pressure test or after fueling the tanks.

By way of background, Glasair Aviation has made thousands of these tanks over the years with a very good history of quality and weld integrity. The materials and processes used in the welding and inspection of the tanks is industry standard. Out of the thousands of tanks made, very few have been released into inventory which subsequently have been shown to have pinholes or leaks. However, the fact is that the inspection process is subject to human factors. It takes a trained and patient eye when looking for these leaks, as they can be very small and occasionally missed during the inspection process. The main and auxiliary fuel tanks are welded along the upper forward edge of the tank and around the end rib perimeters and all threaded fitting ports. Pinholes, if any, have historically been along these welded seams. Rivets are driven through the skins and ribs to hold the tank together until they are welded closed. These rivets typically are not a location of pinholes, but should be checked for possible sources of leaks.

Most recently, a customer notified us that one of his main tanks showed signs of a fuel tank leak. During flight test and after post flight inspections, fuel dye stains were noted on the undersurface of the wing and the inside of the wing had an odor of fuel. Inspection revealed that fuel was not leaking out of any of the fuel line or vent fittings, and it was concluded that fuel must have been leaking somewhere along a welded seam. The tank was removed and upon examination of the tank by Glasair Aviation, a pinhole was discovered on a weld next to a threaded port.

The fuel tank in question was very recently purchased from Glasair Aviation; thus we pulled all fuel tanks currently in inventory and inspected them again. In this process, a few additional tanks were found to have minor pinholes in weld seams. All tanks were easily and successfully repaired and returned to inventory.

Statistically speaking, a very, very small percentage of tanks that have been delivered to customers might have pinholes; nevertheless, Glasair Aviation LLC feels it is prudent to have customers inspect applicable fuel tanks prior to first flight. (See date range above.)

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Recommended Action:

Group 1 Aircraft: If you are currently flying and your fuel tanks show no visible signs of leaking, no further action is required.


Group 2 Aircraft: If you have not yet flown and your wings are **final riveted and installed** on your fuselage, it is your option whether or not to wait until first flight. As you know, it is a large amount of work to remove the wings if a leak is discovered, so the best option may be to just wait until the first time the airplane is fueled to see if any leaks are present.

Group 3 Aircraft: If your wings are **final riveted but not installed** on your fuselage, it is recommended that you test all applicable fuel tanks at this time. To do this, we recommend you bench test your tanks. If your fuel system is installed with the auxiliary tanks, vent lines and transfer pump in place, you should only need to attach the inboard fuel line and vent fittings on your main tank inboard side using the fittings and flexible rubber fuel lines as shown in Steps 83-85 of your Sportsman Final Assembly Manual (or Steps 86-88 in the GlaStar Final Assembly Manual).

Use extreme caution when filling your tanks with fuel and working with open containers of fuel. This should only be done outside and you should have fire extinguishers rated for chemicals nearby. Make sure you ground the wing with a ground wire and always place your hands on the wing for the first time away from the filler neck to “ground” yourself to the wing in a safe area. Plastic fuel containers will hold a lot of static electricity, so be sure the filler neck is in contact with the edge of the tank opening when pouring fuel in the tanks to avoid the possibility of a static discharge.

The weld seams are located on the inboard and outboard face and along the upper forward edge of each tank and at all threaded fitting ports. When testing the tank, you should set your wing on padded saw horses or supports with the ability to adjust the attitude of the wing to ensure these seams are fully bathed in fuel. Be sure to have the wings supported and padded at rib locations to avoid denting any skins. Check that all fuel fittings have thread sealant and are torqued down and all ports are capped off.

Fill up the main tank with aviation fuel to within ½” of the filler neck. Install the filler neck and cap, but remember that these threads are not pipe threads and will not hold fuel without a sealant applied to the threads. The thread sealant we have had best success with is: Seal Lube, Aircraft Spruce part # 09-25200. Seal Lube serves as both a superior anti-seize lubricant and a thread sealant and is insoluble in gasoline, oil and water. Installing the sleeve without thread sealant can result in galling.

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Make sure your vent line is open. (It is recommended that you test the main fuel tank and the auxiliary tank separately.) ***It is very important that you do not let the fuel leak out of the filler neck as you will need to use your nose to sniff out any small leaks.*** With small pinhole leaks such as these, the fuel will typically not drip. Rather, it will slowly weep out and evaporate before it has a chance to travel very far. Inspect all fuel ports for fuel leakage and tighten if necessary. Wait several hours and inspect and sniff for any signs of fuel by poking your nose inside inspection holes and also look for seeping out between the root rib and the lower skins. These are very slow leaks and for a thorough test, let the fuel sit for several hours or more. If you smell fuel, you may want to tilt the wing slightly to see if any fuel will seep out between the skins. But be sure you are not smelling fumes that may escape through the fuel cap. You want to be certain that a leak exists before going through the work of removing a tank.


Repeat the above process for the auxiliary tanks and header tanks if applicable.

When you are all done with the test, drain out all fuel from the tank. It is recommended that you blow the tank dry to completely remove all fuel and dangerous vapor from the tanks.

Group 4 Aircraft: If your wings are **not final riveted and your tanks are removable**; you are required to test the tanks at this time. You should test the tank by itself, using the techniques that follow:

- Instructions for testing the Main Tank – pages 4 and 5
- Instructions for testing the Auxiliary Tank – pages 6 and 7
- Instructions for testing the Header Tank – pages 8 and 9

Upon request, Glasair Aviation will supply a testing kit. A \$100 deposit is required. If the testing kit is returned to Glasair Aviation within 14 days, the deposit will be refunded in full. If the kit is returned within 30 days, the builder will be charged a \$50 rental fee. If the testing kit is not returned within 30 days, a \$50 rental fee will be charged and the deposit will be forfeited (for a total cost of \$150). Please contact Customer Service at 360-435-8533 x2. or parts@glasairaviation.com to obtain a testing kit.

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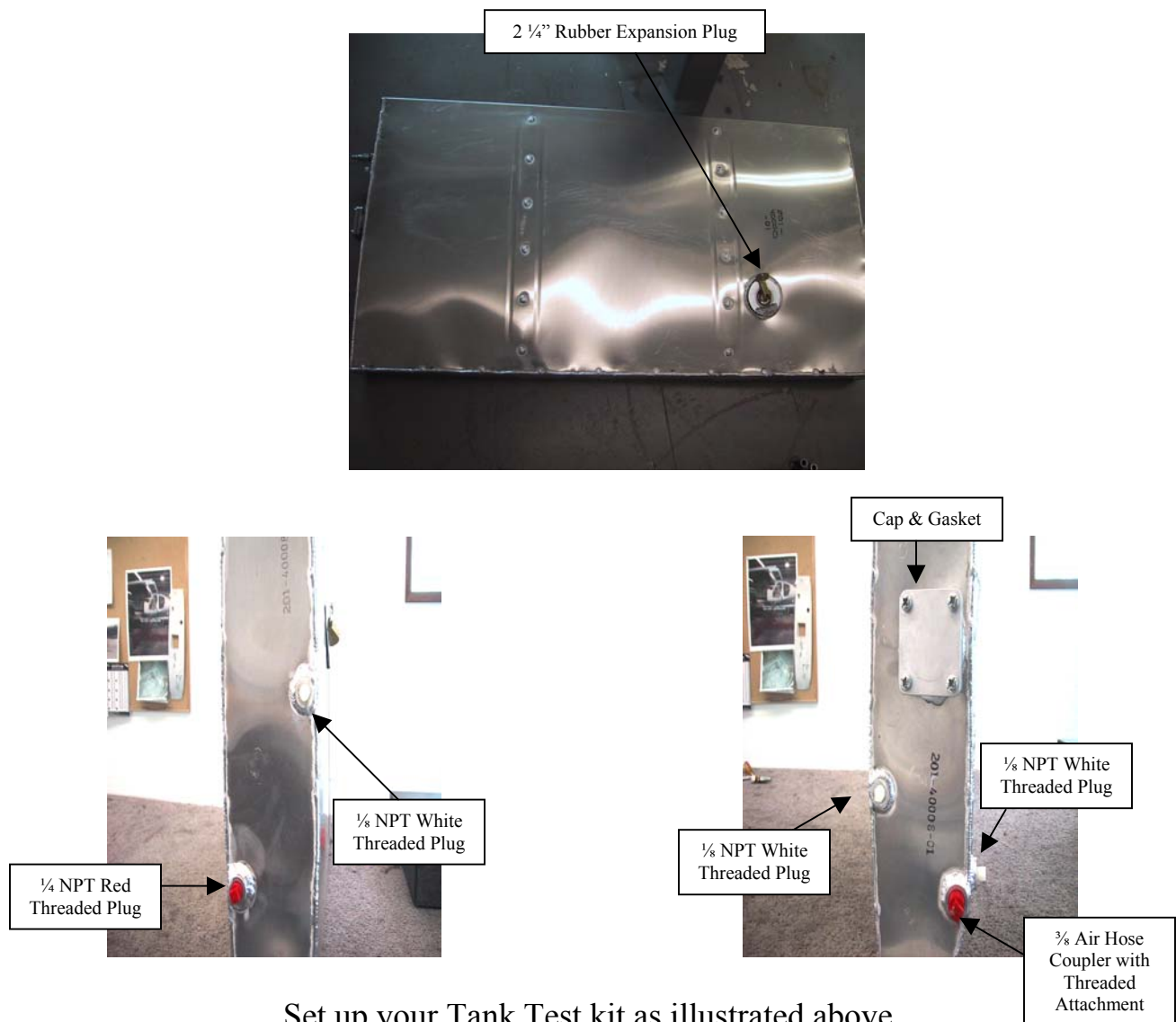
Instructions for Testing Main Tank

Install plugs, caps and expansions plug as shown in picture below. Attach air hose set on one end to ¼” coupler and attach other end to air source. Pressurize to 3 lbs. Check for bubbles using one of the methods below.


201-40000-01 & 02 Main Fuel Tank Test Kit Set Up

Included in Kit:

- (3) ¼ NPT White threaded plugs
- (1) ¼ NPT Red threaded plug
- (1) Air hose set with regulator
- (1) 2 ½ Rubber expansion plug
- (1) Cap & gasket
- (1) ⅜ Air hose coupler with threaded attachment



Set up your Tank Test kit as illustrated above.

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There are two ways to test the tank: Testing using either the *Dunk Method* or *Spray Bottle & Soap Method*.

TESTING USING DUNK METHOD – *Preferred Method*

This test is performed by using any liquid holding tank that leaves plenty of room for the main tank and the water to be filled deep enough to cover the tank when submerged; for example, a kiddy pool or trough.

STEP A DO NOT EXCEED 3 PSI ON REGULATOR GAUGE --- EXCEEDING 3 PSI COULD RESULT IN INJURY AND/OR TANK DAMAGE!
Turn on air source and run air into the main tank, slowly rising pressure in tank.

STEP B Once 3 PSI has been reached in the tank, hold tank under water and look for streamline bubbles. Watch for bubbles from the weld areas. A small amount of bubbles may be visible at fitting areas; this is not cause for concern. If the bubbles are cause for question, remove tank, tighten fixtures and dunk again.

TESTING USING SPRAY BOTTLE & SOAP METHOD


This test can be performed using any type of applicator that spreads a soap and water mixture onto the main tank, such as a spray bottle.

STEP A Mix 2 Tablespoons liquid soap per pint of water.

STEP B DO NOT EXCEED 3 PSI ON REGULATOR GAUGE --- EXCEEDING 3 PSI COULD RESULT IN INJURY AND/OR TANK DAMAGE!
Turn on air source and run air into the Main Tank, slowly rising pressure in tank.

STEP C Once 3 PSI has been reached in the tank, spray all areas of weld on the tank and look for streamline bubbles. Watch for bubbles from the weld areas. A small amount of bubbles may be visible at fitting areas; this is not cause for concern. If the bubbles are cause for question, dry tank, tighten fixtures and spray with soap & water solution again.

Should either test method produce stream line bubbles, please call Glasair Customer Support @ 360-435-8533 ext. 221.

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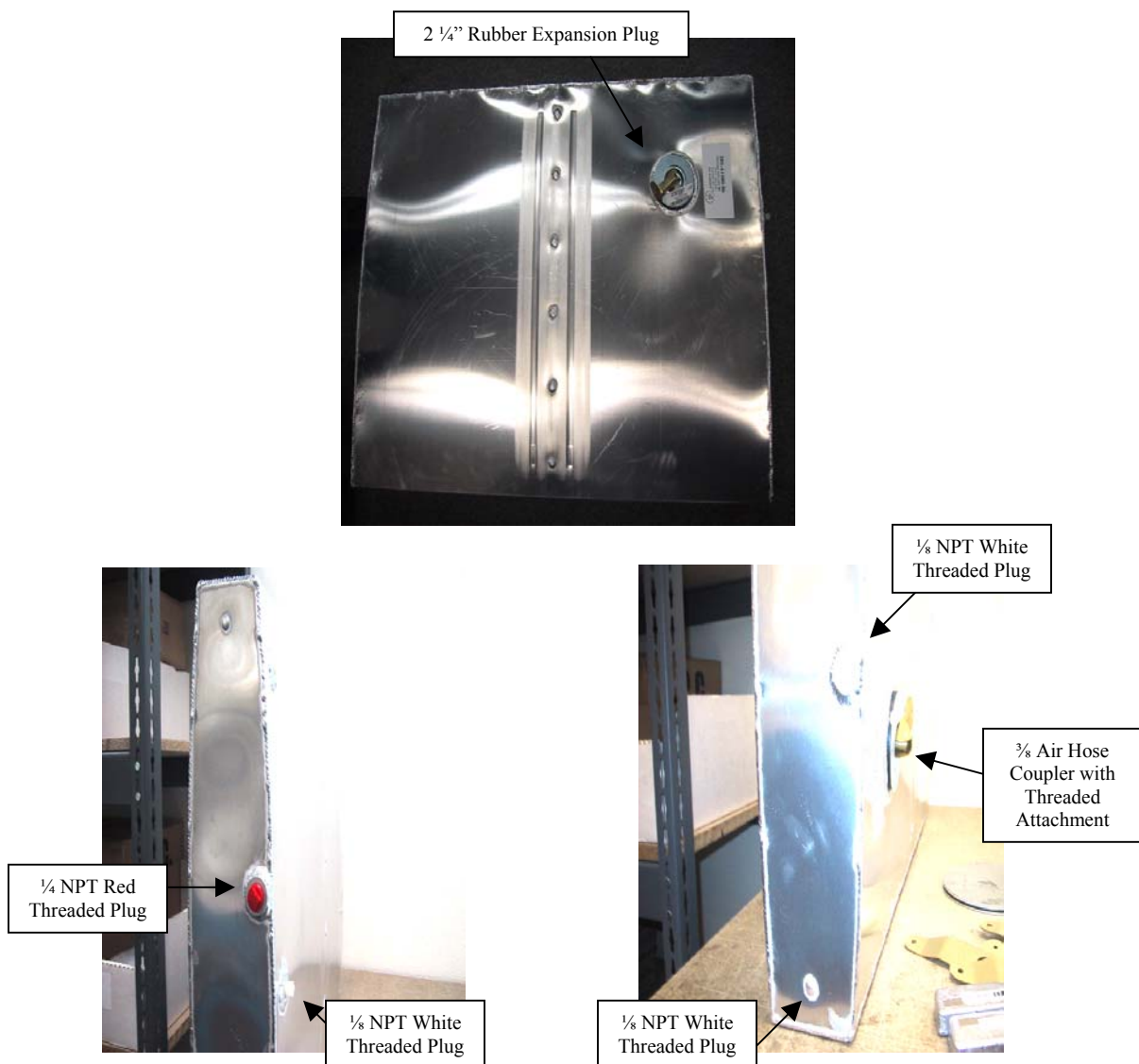
Instructions for Testing Auxiliary Tank

Install plugs, caps and expansions plug as shown in picture below. Attach air hose set on one end to ¼" coupler and attach other end to air source. Pressurize to 3 lbs. Check for bubbles using one of the methods below.


201-41000-05 & 06 Auxiliary Tank Test Kit Set Up

Included in Kit:

- (3) ¼ NPT White threaded plugs
- (1) 2 ½ Rubber expansion plug
- (1) Air hose set with regulator
- (1) ¾ Air hose coupler with threaded attachment



Set up your Tank as illustrated above.

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There are two ways to test the Auxiliary Tank: Testing using either the *Dunk Method* or *Spray Bottle & Soap Method*.

TESTING USING DUNK METHOD – Preferred Method

This test is performed by using any liquid holding tank that leaves plenty of room for the Auxiliary Tank and the water to be filled deep enough to cover the Auxiliary Tank when submerged; for example, a kiddie pool or trough.

STEP A DO NOT EXCEED 3 PSI ON REGULATOR GAUGE --- EXCEEDING 3 PSI COULD RESULT IN INJURY AND/OR TANK DAMAGE!

Turn on air source and run air into the Auxiliary Tank, slowly rising pressure in tank.

STEP B Once 3 PSI has been reached in the Auxiliary Tank, hold tank under water and look for streamline bubbles. Watch for bubbles from the weld areas. A small amount of bubbles may be visible at fitting areas; this is not cause for concern. If the bubbles are cause for question, remove Auxiliary Tank, tighten fixtures and dunk again.

TESTING USING SPRAY BOTTLE & SOAP METHOD

This test can be performed using any type of applicator that spreads a soap and water mixture onto Auxiliary Tank, such as a spray bottle.


STEP A Mix 2 Tablespoons liquid soap per pint of water.

STEP B DO NOT EXCEED 3 PSI ON REGULATOR GAUGE --- EXCEEDING 3 PSI COULD RESULT IN INJURY AND/OR TANK DAMAGE!

Turn on air source and run air into the Auxiliary Tank, slowly rising pressure in tank.

STEP C Once 3 PSI has been reached in the tank, spray all areas of weld on the Auxiliary Tank and look for bubbles. Watch for bubbles from the weld areas. A small amount of bubbles may be visible at fitting areas; this is not cause for concern. If the bubbles are cause for question, dry Auxiliary Tank; tighten fixtures and spray with soap & water solution again.

Should either test method produce stream line bubbles, please call Glasair Customer Support @ 360-435-8533 ext. 221.

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Instructions for Testing Header

Attach air hose set on 1/4" coupler and attach other end to air source. Pressurize to 3 lbs. Checks for bubbles using one of the methods below.

510-01200-01 & 02 Header Test Kit Set Up

Included in Kit:

- (1) Air hose set with regulator
- (2) Blue hose plugged attachments
- (3) 1/4" coupler



Set up your Header as illustrated above.

There are two ways to test the Header: Testing using either the *Dunk Method* or *Spray Bottle & Soap Method*.

TESTING USING DUNK METHOD – *Preferred Method*

This test is performed by using any liquid holding tank that leaves plenty of room for the header and the water to be filled deep enough to cover the header when submerged; for example, a kiddie pool or trough.

STEP A DO NOT EXCEED 3 PSI ON REGULATOR GAUGE --- EXCEEDING 3 PSI COULD RESULT IN INJURY AND/OR TANK DAMAGE!

Turn on air source and run air into the header, slowly rising pressure in header.

STEP B Once 3 PSI has been reached in the header, hold header under water and look for streamline bubbles. Watch for bubbles from the weld area. A small amount of bubbles may be visible at fitting area; this is not cause for concern. If the bubbles are cause for question, remove header, tighten fixture and dunk again.

TESTING USING SPRAY BOTTLE & SOAP METHOD

This test can be performed using any type of applicator that spreads a soap and water mixture onto the header, such as a spray bottle.


STEP A Mix 2 Tablespoons liquid soap per pint of water.

STEP B DO NOT EXCEED 3 PSI ON REGULATOR GAUGE --- EXCEEDING 3 PSI COULD RESULT IN INJURY AND/OR TANK DAMAGE!

Turn on air source and run air into the header, slowly rising pressure in header.

STEP C Once 3 PSI has been reached in the header, spray all areas of weld on the header and look for bubbles. Watch for bubbles from the weld area. A small amount of bubbles may be visible at fitting area; this is not cause for concern. If the bubbles are cause for question, dry header, tighten fixture and spray with soap & water solution again.

Should either test method produce stream line bubbles, please call Glasair Customer Support @ 360-435-8533 ext. 221.

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