



Memorandum For Record

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As part of the on-wing pressure testing of the fuel caps, “Sherlock Gas and Air Leak Detector Type I” (Sherlock) test fluid was used to detect leaks in the area of the fuel caps¹. The test conditions were no more than .5 psi applied to the respective fuel vent line, the fuel selector off, and a solution to detect leaks. The fuel caps which were previously labeled by the Federal Aviation Administration inspector were verified to be installed on their proper side. The air pressure was set to .5 psi and the Sherlock was applied to the outer perimeter of the left fuel cap. Immediately large air bubbles were noted (Figure 1). The solution was dried and then added to the axle area of the cap and no bubbles were noted. The fuel tank access panel that housed the fuel cap was then tested on the perimeter and no fuel leaks were noted.

The right side fuel cap was then inspected for the original marking and was placed back into its receptacle on the wing. The fuel tank was pressure tested to .5 psi through the fuel tank vent line and small bubbles were noted on the aft side of the cap near the lever (Figure 2), or about the 7 o’clock position when viewed from the pilot’s seat looking forward. The solution was dried and then added to the axle area of the cap and no bubbles were noted. The fuel tank access panel that housed the fuel cap was then tested on the perimeter and no fuel leaks were noted. Following the testing both fuel caps were sent to the fuel cap manufacturer’s facility in Florida for testing.

During examination of the fuel caps at the manufacturer’s facility, both had loose handles and exhibited very little resistance and no audible snap when the handle was closed and locked. Testing of the left fuel cap could not be completed because of the extensive leakage, while the right fuel cap failed the pressure testing. Both fuel caps were completely disassembled revealing the outer and inner o-rings of both were dimensionally correct. Both contained unapproved, modified, and/or missing parts. Both fuel caps were re-assembled with new hardware as required and passed the acceptance testing which included pressure testing to 25 psig.

¹ According to literature associated with the product, “Large leaks form large bubbles almost instantly.”

The fuel caps were returned to the salvage facility to repeat the on-wing testing, using the same Sherlock test fluid. During testing of both fuel caps done at .5 psi applied to the fuel vent. During testing of the left fuel cap bubbles were immediately noted at the 5 o'clock position² (Figure 3), but there was no leak noted around the axle. During testing of the right fuel cap, small bubbles were noted at the 7 o'clock and 11 o'clock positions³ (Figure 4). There was no leak noted around the axle.

Each wing plate with attached doubler, adapter, and fuel cap were then sent to the fuel cap manufacturer's facility for further testing to determine the source of the leakage. Following manufacturing of a fixture, no leakage was noted between either fuel cap and its mating adapter, but leakage was noted between the adapter and the doubler of each assembly at low pressures (.45 psi and .28 psi) which increased in intensity as the pressure increased. The parts were returned to the salvage facility.

² As viewed from the pilot seat looking forward

³ As viewed from the pilot seat looking forward

APPENDIX – PHOTOGRAPHS

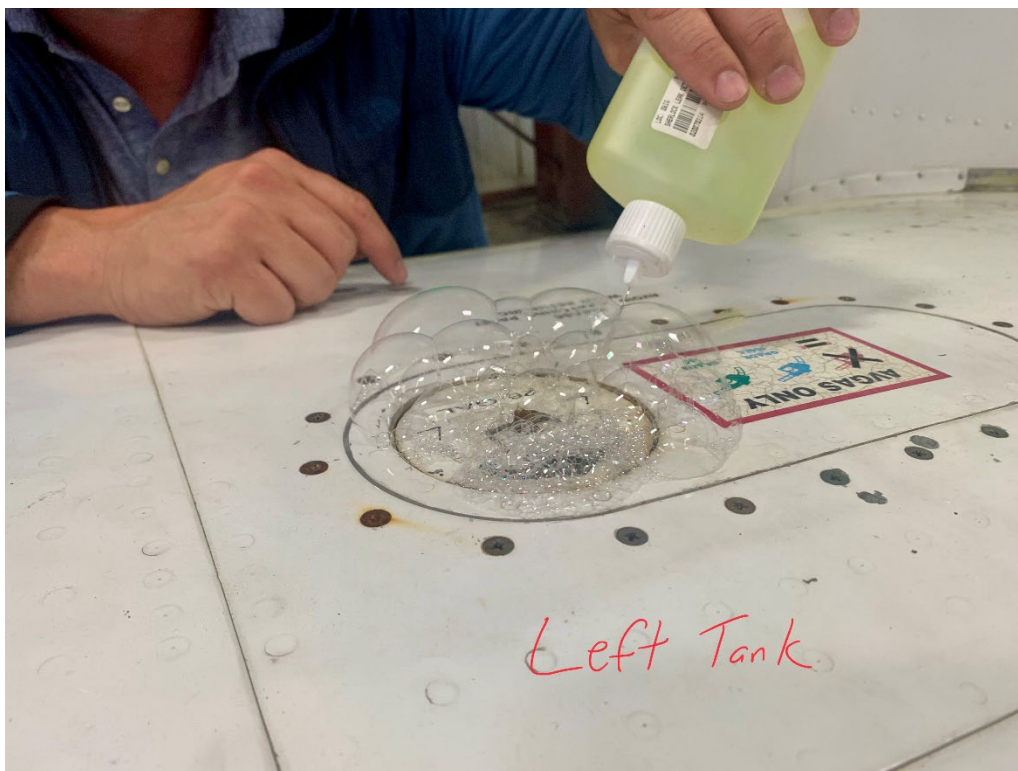


Figure 1: Digital Photograph From David Stanton. Left Fuel Cap Pressure Test Results.

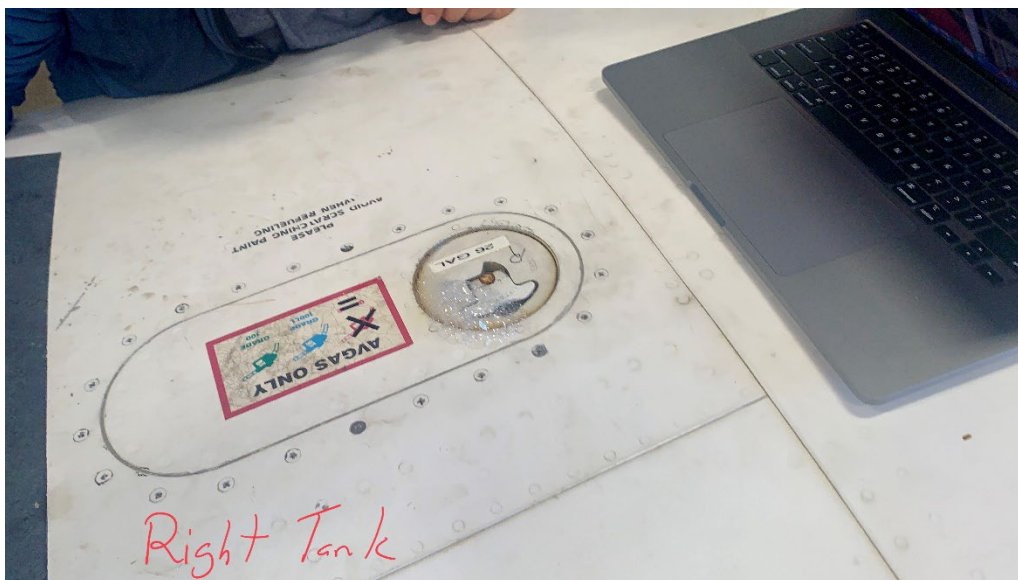


Figure 2: Digital Photograph From David Stanton. Right Fuel Cap Pressure Test Results. Note the Small bubbles.

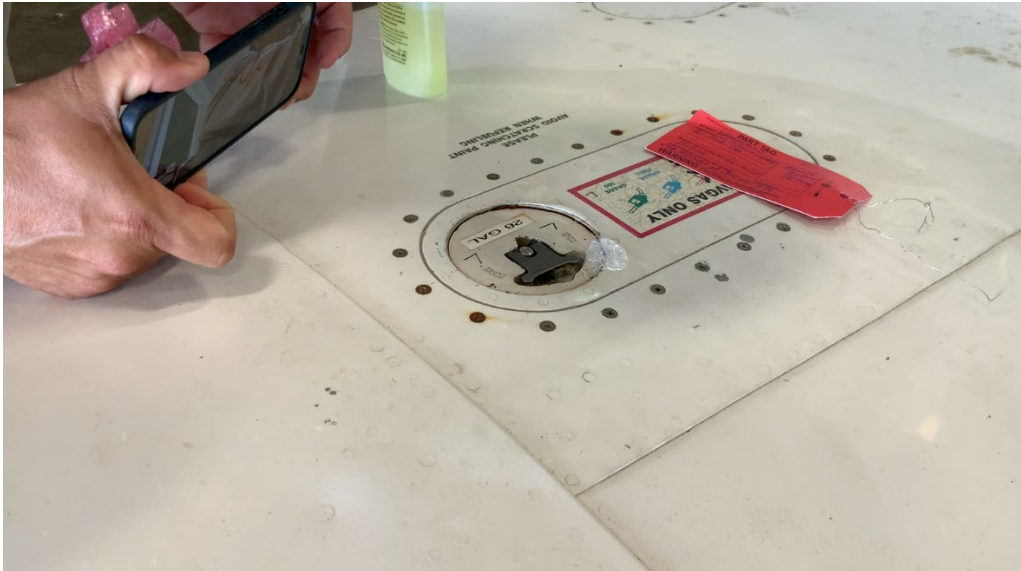


Figure 3: Digital Photograph From David Stanton. Left Fuel Cap Pressure Test Results After Fuel Cap repair. Note the Small Bubbles and the decreased Amount Compared to the Original Test in Figure 1.

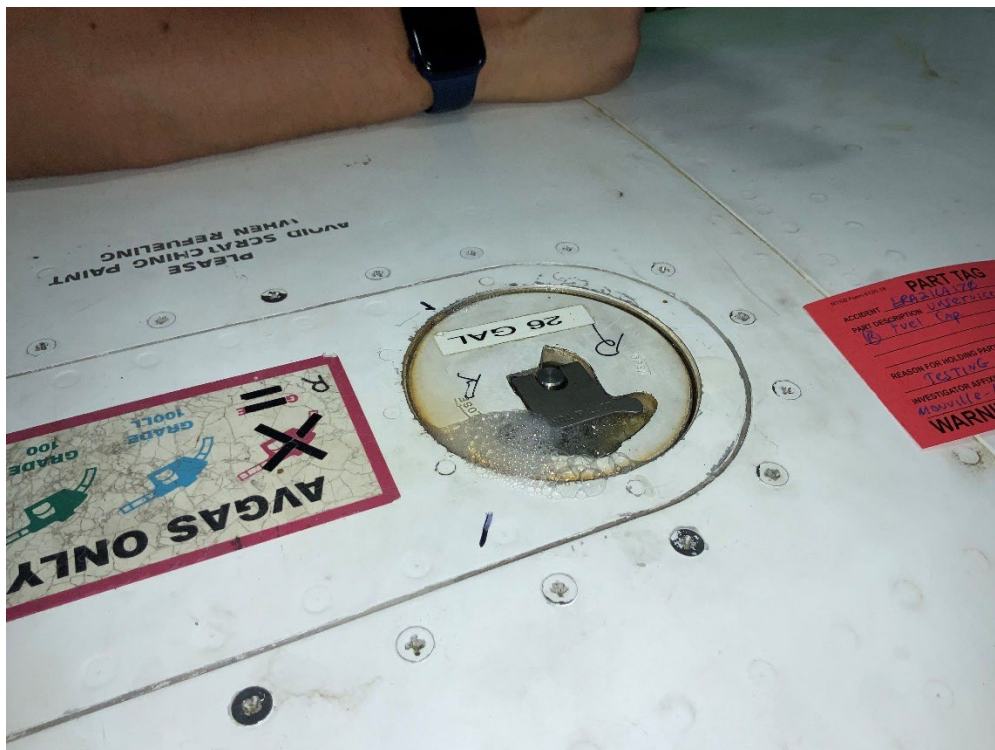


Figure 4: Digital Photograph From David Stanton. Right Fuel Cap Pressure Test Results After Fuel Cap repair. Note the Small Bubbles and the Slight decreased Amount Compared to the Original Test In Figure 2.