

Mooney Accident – Additional Panel Testing

Testing was conducted on November 30, 2021 at the Naples site of Parker Aerospace. The purpose of the testing was to determine if there was leakage between the aircraft panel and the gravity fill adaptor and/or between the gravity fill adapter and the cap.

Procedure:

The procedure followed to conduct this testing was:

1. Clean off the remaining sealant from around the flanges of the two panels
2. Install the Left panel with the Left cap on the test fixture
3. Slowly pressurize the fixture to 25 psi while looking for leaks between the cap and adapter, and between the panel and adapter. If there is leakage, the pressure at which it started, and location(s) of the leak(s) will be recorded.
4. Once completed, if there was leakage found between the cap and adapter, the cap will be replaced with a good new production cap to see if the problem is the cap or the adapter.
5. Remove the panel.
6. This testing will then be repeated on the Right panel and Right cap.

Results:

Left Panel and Left Cap

1. It was determined that removal of the remaining sealant from the Left panel flanges was not necessary to obtain a good seal between the panel and test fixture. The o-ring seal provided an adequate seal. See Figure 1.
2. The Left cap was installed into the Left panel (Figures 2 & 3). The assembly was then installed into the test fixture and submerged under water in the test stand.
3. The fixture assembly was then slowly pressurized to 25 psi. It was observed that at a pressure of 0.1 psi, there was a steady stream of bubbles coming from between the aircraft panel and the gravity fill adaptor (Figure 4) at the 7 o'clock position (as installed in the test stand). As the pressure was increased, additional leakage was seen at .45 psi (12 o'clock position, Figure 5). At 25 psi, a large amount of bubbles were coming from each of these locations with the most extreme being at the 7 o'clock position (Figure 6).
4. There was no leakage noted between the gravity fill adapter and the cap, so replacement of the cap was not necessary.
5. The panel was then removed from the test fixture and installed into another test stand to provide an additional check for leakage between the gravity fill adapter and the cap (see Figures 7 & 8). In this test, pressure was applied to the back side of the panel, with water covering the cap and adapter. The setup was then slowly pressurized to 25 psi. Again, there was no leakage noted between the Left gravity fill adapter and the cap.

Right Panel and Right Cap

1. It was determined that removal of the remaining sealant from the Right panel flanges was not necessary to obtain a good seal between the panel and test fixture. The o-ring seal provided an adequate seal. See Figure 1.
2. The Right cap was installed into the Right panel (Figures 2 & 3). The assembly was then installed into the test fixture and submerged under water in the test stand.
3. The fixture assembly was then slowly pressurized to 25 psi. It was observed that at a pressure of 0.28 psi, there was a steady stream of bubbles coming from between the aircraft panel and the gravity fill adaptor (Figure 9) at the 10 o'clock position (as installed in the test stand). As the pressure was increased, no additional leakage positions found. At 25 psi, a massive amount of bubbles were coming from the 10 o'clock position (Figures 10 & 11).
4. There was no leakage noted between the gravity fill adapter and the cap, so replacement of the cap was not necessary.
5. The panel was then removed from the test fixture and installed into another test stand to provide an additional check for leakage between the gravity fill adapter and the cap (see Figures 12 & 13). In this test, pressure was applied to the back side of the panel, with water covering the cap and adapter. The setup was then slowly pressurized to 25 psi. Again, there was no leakage noted between the Right gravity fill adapter and the cap.



Figure 1: Test Fixture



Figure 2: Panel Assy's

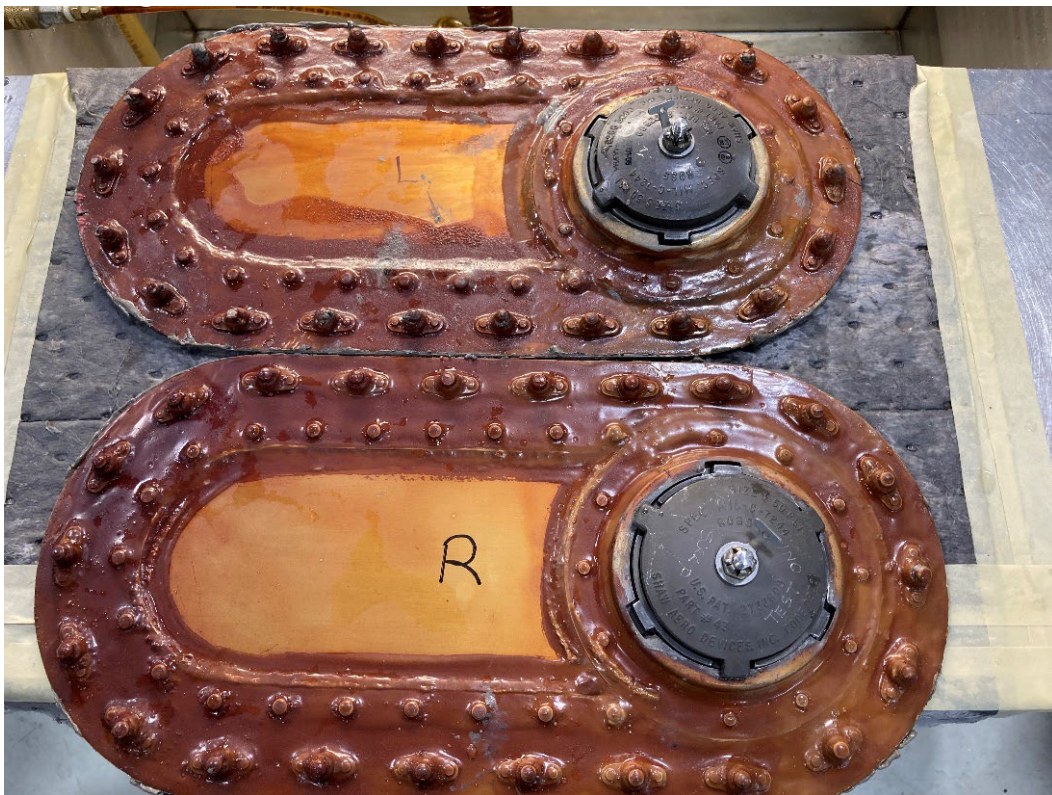


Figure 3: Panel Assy's – Backside

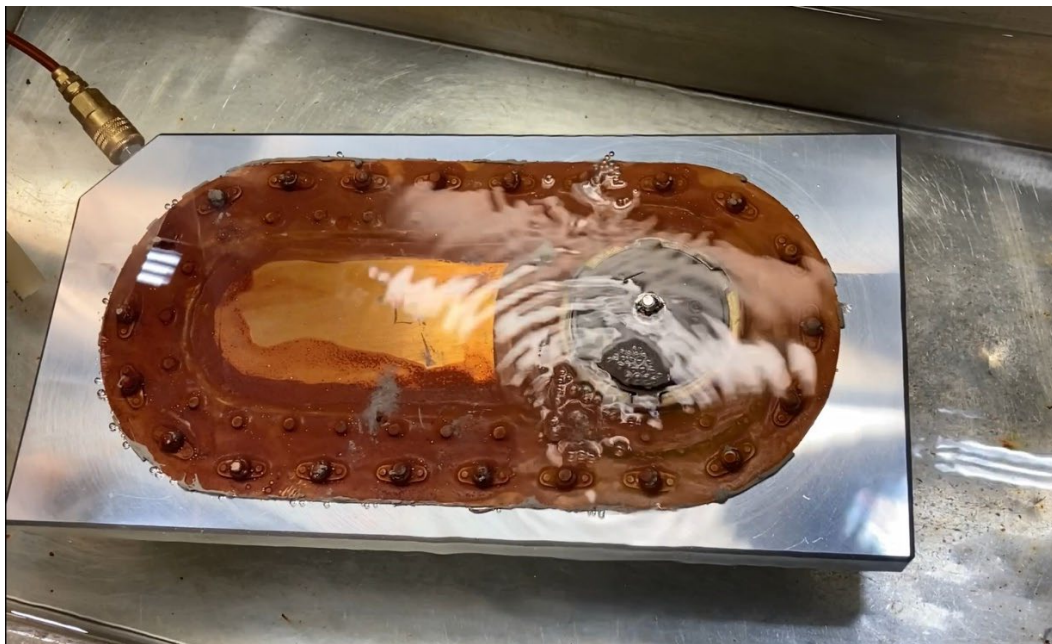


Figure 4: Left Panel Leak Test .28 psi

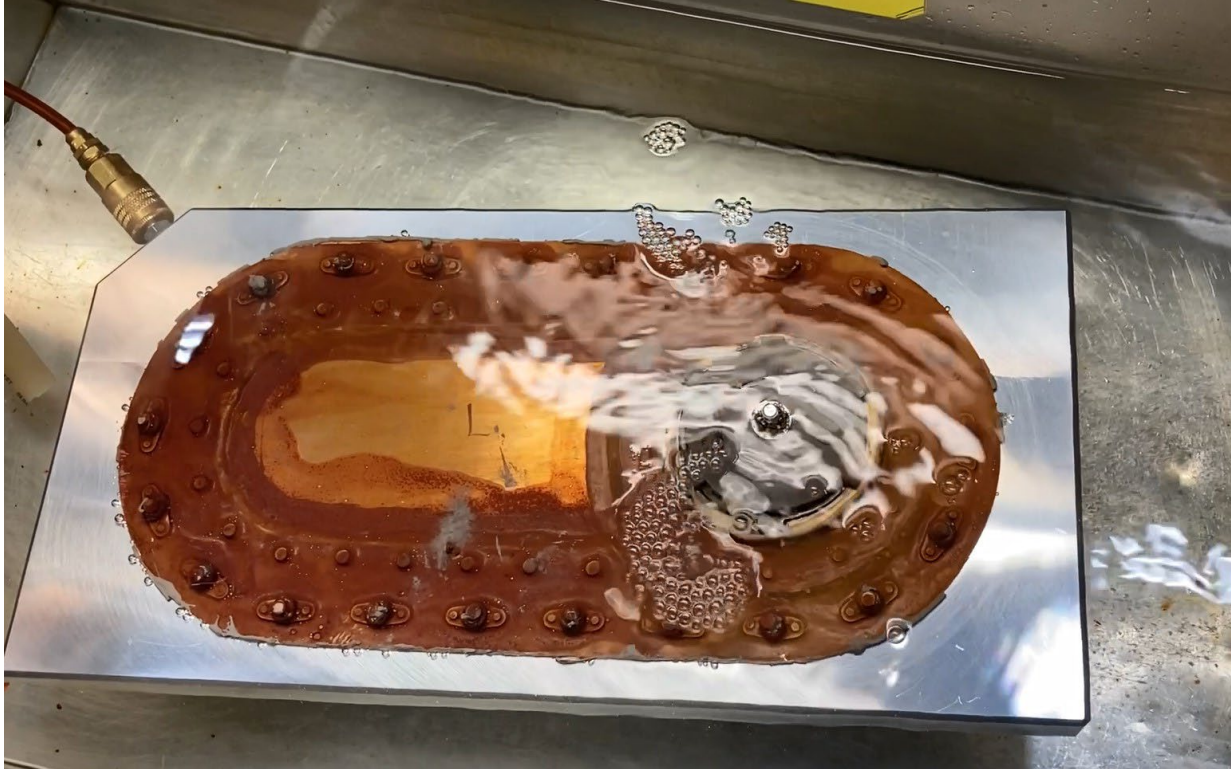


Figure 5: Left Panel Leak Test .45 psi

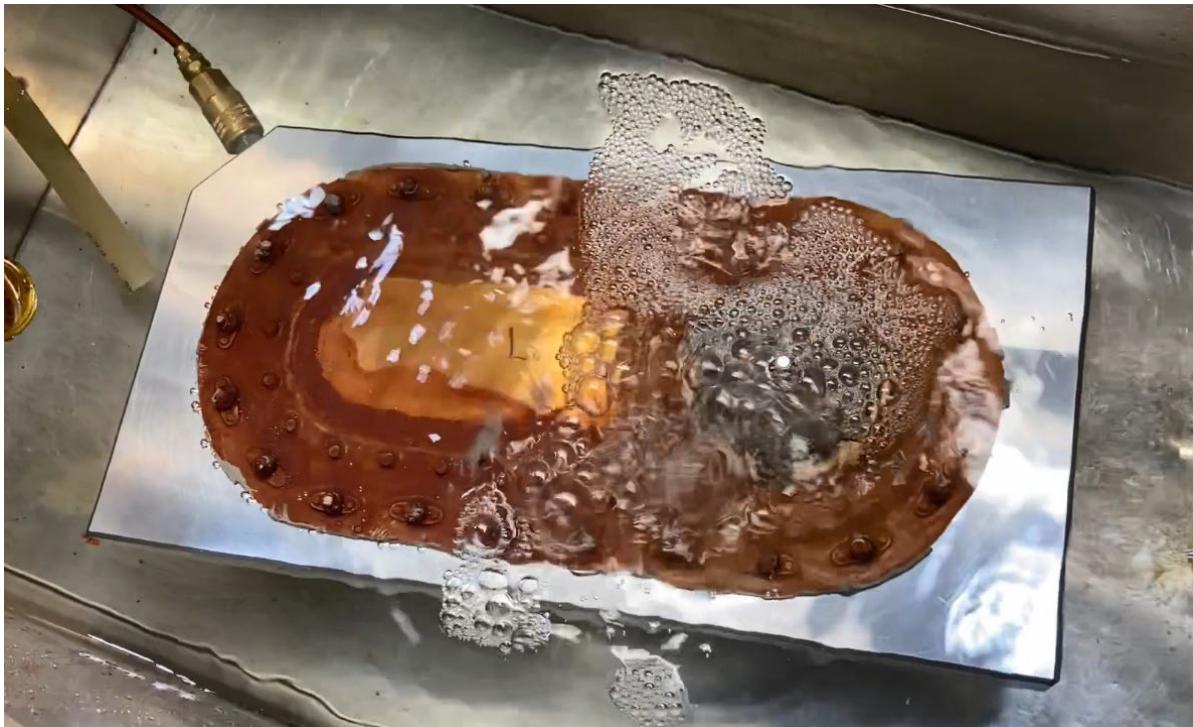


Figure 6: Left Panel Leak Test 25 psi



Figure 7: Left Cap-Adapter Leak Test 25 psi



Figure 8: Left Cap-Adapter Leak Test 25 psi Gage

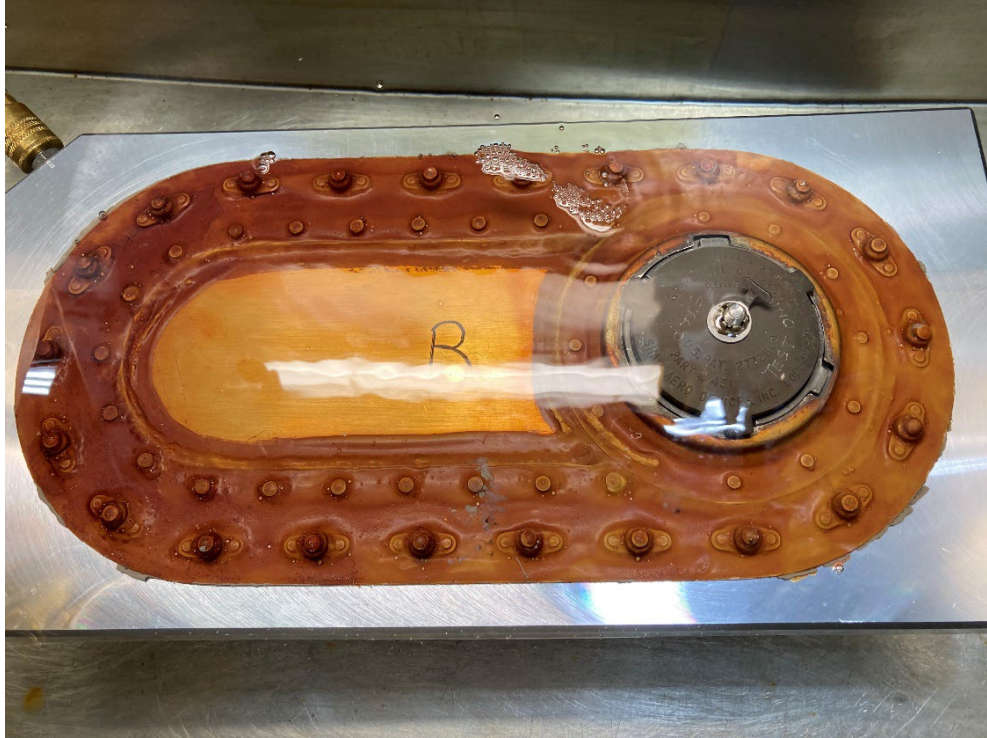


Figure 9: Right Panel Leak Test .28 psi



Figure 10: Right Panel Leak Test 25 psi



Figure 11: Right Panel Leak Test 25 psi Gage



Figure 12: Right Cap-Adapter Leak Test 25 psi



Figure 13: Right Cap-Adapter Leak Test 25 psi Gage