BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 4.11

PRODUCTION PROCESS STANDARD

Pressure Testing DASH 8 Series 100, 200 & 300 Integral Fuel Tanks

Issue 12
- This standard supersedes PPS 4.11, Issue 11.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-4365.
- This PPS is effective as of the distribution date.

Prepared By:	(Michael Wright)	April 22, 2014
	Production Process Standards (PPS)	
Approved By:	(L.K. John)	April 22, 2014
	Materials Technology	
	(Adam Gordon)	April 24, 2014
	Quality	

Signed original on file. Validation of paper prints is the responsibility of the user.

Table of Contents

Sections **Page**

Figures

1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for pressure testing the Dash 8 Series 100, Series 200 and Series 300 standard and extended range integral fuel tanks.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS must be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. **do not** supersede the procedure or requirements specified in this PPS.

2 Hazardous Materials

2.1 Before receipt at Bombardier Toronto (de Havilland), all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto (de Havilland) Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto (de Havilland) Environment, Health and Safety Department.

3 References

3.1 PPS 4.19 - Cleaning of Fuel Tanks.

3.2 PPS 13.26 - General Subcontractor Provisions.

3.3 PPS 21.03 - Priming and Sealing of Integral Fuel Tanks.

4 Materials and Equipment

4.1 Materials

4.1.1 Leak detector solution (e.g., Turco Leak Detector, Sigma-Aldrich Leak-Tec, MIL-L-25567, etc.). When using Turco Leak Detector solution, mix 5 oz. with water to make up 1 imp. gallon of solution. Use Leak-Tec leak detector solution as received (i.e., do not thin with water).

4.1.2 DHMS S3.01/B2 sealing compound.

4.2 Equipment

4.2.1 Pressure test rig, tool #85710001-001-141 or #85710001-003-141 (see Figure 1). Do not use any other rigs to pressure test DASH 8 fuel tanks.

4.2.2 Coveralls, lint-free cotton or 65/35 polyester/cotton blend. Use of 100% cotton coveralls which are not qualified as lint-free is **not** acceptable.

4.2.3 Dummy access covers, DASH 8 Series 100, 200 and 300 main fuel tank, SD6080.

4.2.4 Dummy access covers, DASH 8 Series 100 and 200 auxiliary fuel tank, SD6185.

4.2.5 Fuel function test kit, (Component Assembly area), 82820005-001-141A.

4.2.6 Fuel function test kit (Stuffing area), 82820005-001-141D.

4.2.7 Fuel function test kit (Final Assembly area), 82820005-001-141E.

4.2.8 Plastic dust covers, SD6201 for DASH 8 Series 100, 200 and 300 standard aircraft.

4.2.9 Plastic dust covers, SD6202 for DASH 8 Series 100, 200 and 300 extended range aircraft.

4.2.10 Rubber plugs (NACA vent duct plugs), SD6176.

5 Procedure

5.1 General

5.1.1 Before pressure testing, ensure pressure test rig gauge and relief valve calibration stickers are valid and have not expired. Do not use a pressure test rig if the gauge and/or relief valve calibration stickers are not valid or have expired.

5.1.2 After installation of the fuel system, pressure test the integral fuel tanks according to this PPS in two separate test operations. The first pressure tests are performed according to section 5.2 and section 5.3 to ensure that the fuel system components penetrating the structure are leak-free. Then, the final test is performed according to section 5.4 to ensure that the fuel tank access cover installation and the completed tank assembly are leak-free before final sealing of the covers.

5.1.3 All personnel working within the fuel tank must wear clean coveralls (see Equipment section, paragraph 4.2.2).

5.1.4 Perform pressure testing only after curing of any sealant that was applied according to PPS 21.03.

5.1.5 Do not use any material that may leave a residue (e.g., putty) to plug holes or other openings.

5.1.6 Keep fuel tank access openings covered at all times when no work or testing is being performed. Use the dummy access covers or the plastic dust covers.

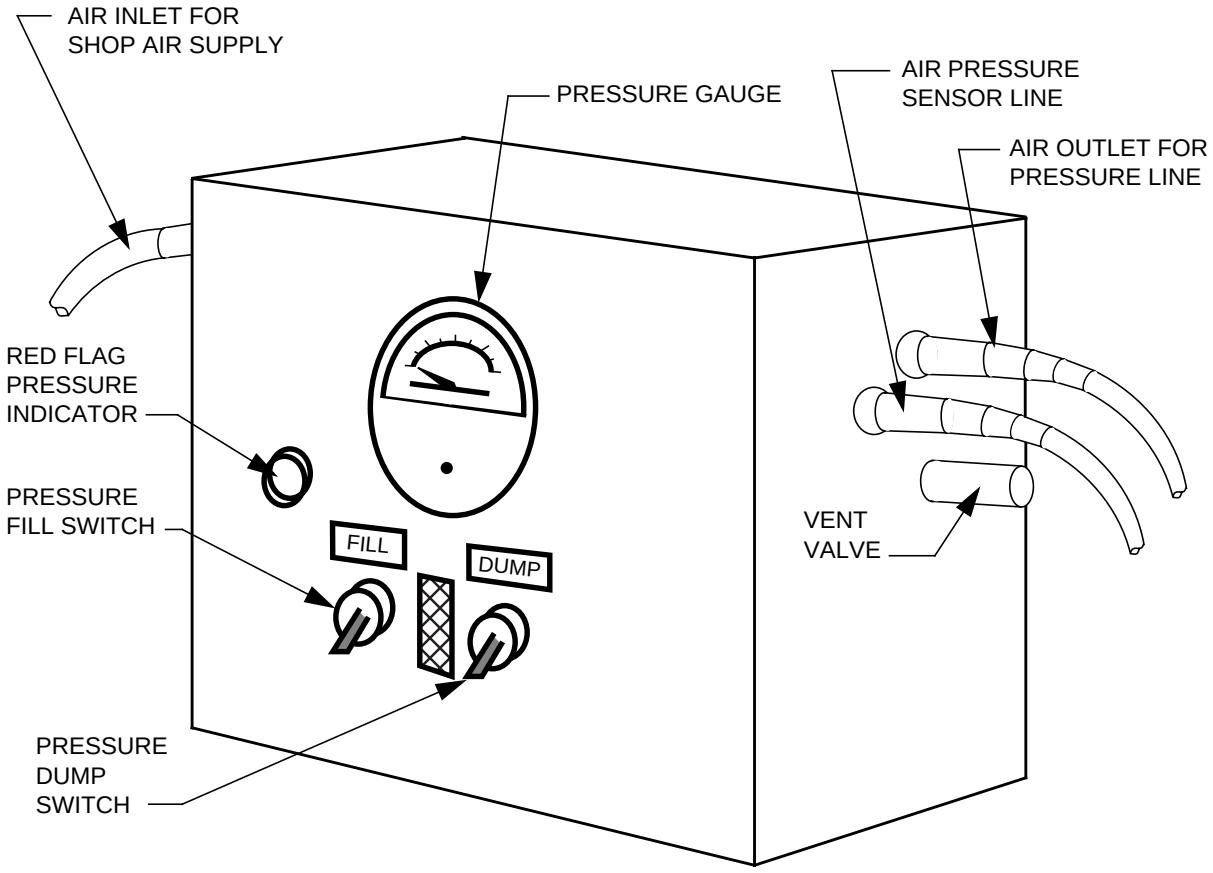


Figure 1 - Pressure Test Rig Components

5.2 First Pressure Tests

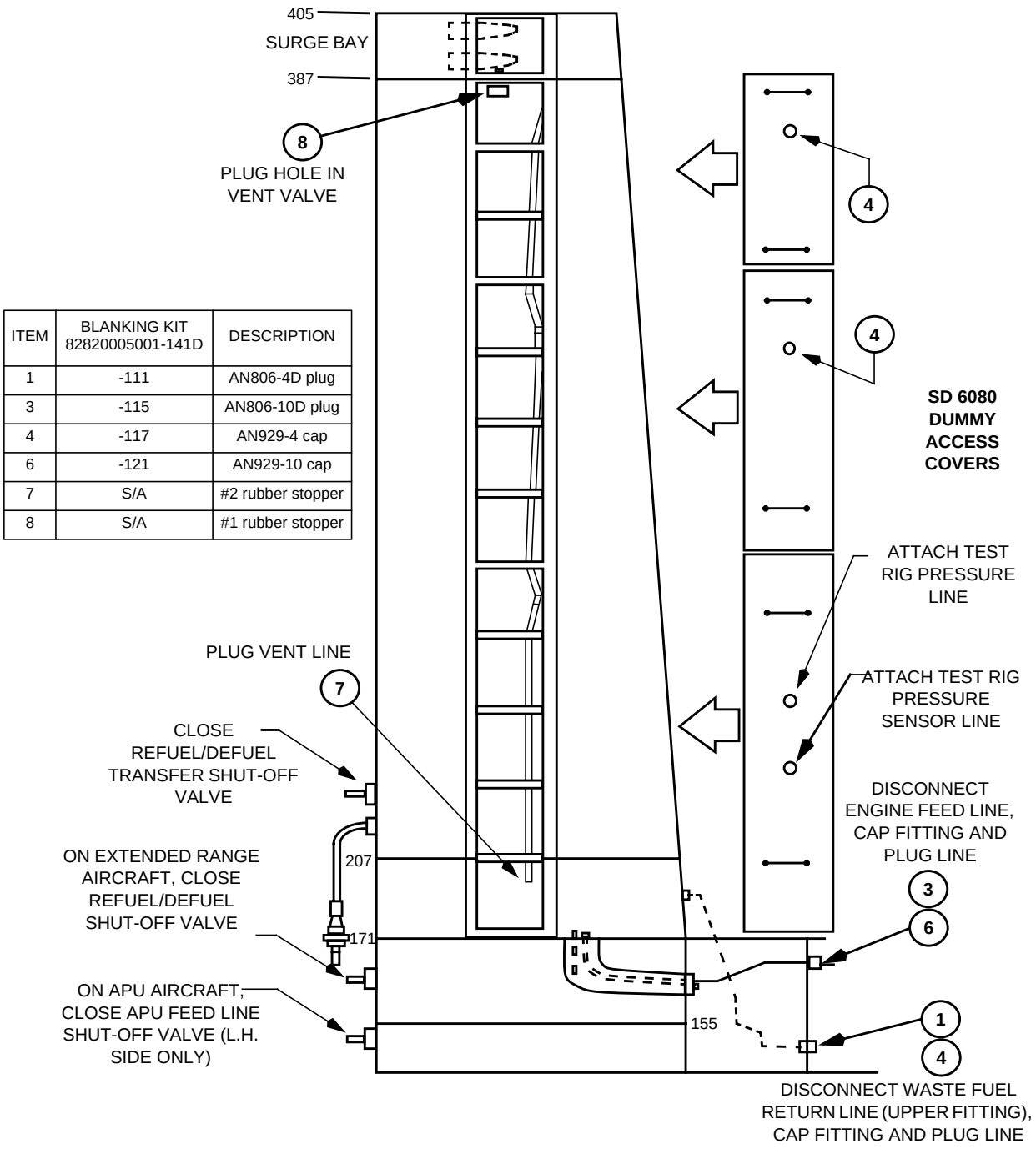
5.2.1 Perform pressure testing of the main fuel tank as follows (see Figure 2):

Step 1. Cap, blank off or plug tank openings and fuel system components, as applicable, using the SD6080 dummy access covers and the 82820005-001-141D test kit.

Step 2. In the collector bay, locate and plug the vent line from the surge bay with a #2 rubber stopper.

Step 3. At the rear spar, close the fuel transfer shut-off valve at STA 203. On extended range aircraft, close the refuel/defuel shut-off valve at STA 159. On APU equipped aircraft, close the APU feed line shut-off valve at STA 152 (left hand side only).

Step 4. At the outboard rib, plug the hole in the vent valve using a #1 rubber stopper.



ITEM	BLANKING KIT 82820005001-141D	DESCRIPTION
1	-111	AN806-4D plug
3	-115	AN806-10D plug
4	-117	AN929-4 cap
6	-121	AN929-10 cap
7	S/A	#2 rubber stopper
8	S/A	#1 rubber stopper

Figure 2 - First Pressure Test of Main Fuel Tank

Step 5. Install the SD6080 inboard, mid and outboard dummy access covers onto the upper wing skin.

Step 6. Attach the test rig pressure line to the fitting on the inboard dummy access cover.

Step 7. Pressure test according to paragraph 5.3.1.

5.2.2 Perform pressure testing of the surge bay as follows (see Figure 4):

Step 1. Close off the NACA vent ducts in the surge bay from the outside (lower wing skins) using the SD6176 rectangular plugs from the 82820005-001-141A kit. If the corners of the ducts have not been fillet sealed to fair in the weld drop-through, apply DHMS S3.01/B2 sealant as shown in Figure 3 and allow to cure according to PPS 21.03 before installing the SD6176 plugs. Ensure warning streamers are attached to the plugs.

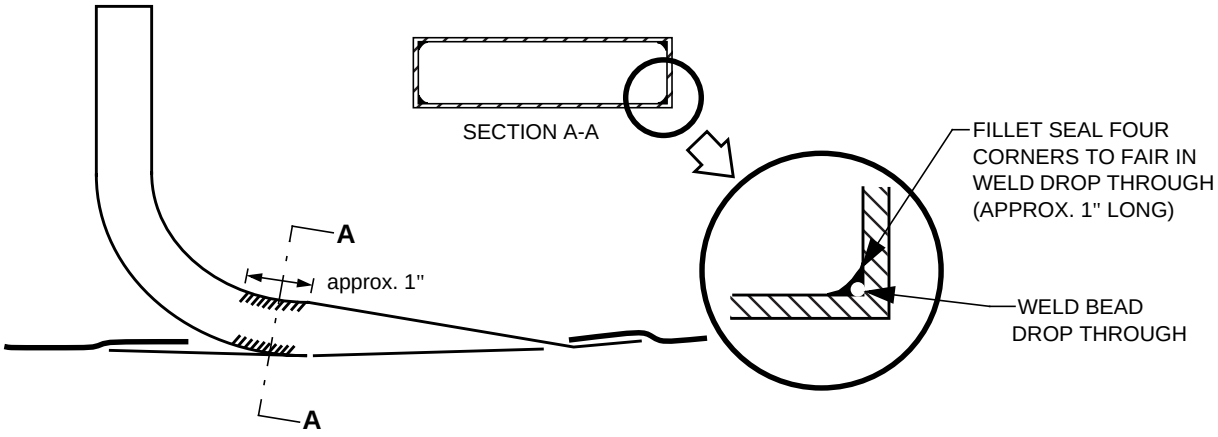


Figure 3 - Fillet Sealing of NACA Vent Ducts

Step 2. Plug the vent line inside the surge bay using a #1 rubber stopper.

Step 3. Plug the vent valve outside of the surge bay (STA 387) with a #1 rubber stopper.

Step 4. Install the SD6080 surge bay dummy access cover.

Step 5. Attach the test rig pressure line to the fitting on the inboard dummy access cover.

Step 6. Pressure test according to paragraph 5.3.1.

5.2.3 Perform pressure testing of the auxiliary fuel tank as follows (see Figure 5):

Step 1. Cap, blank off or plug tank openings and fuel system components, as applicable, using the SD6185 dummy access covers and the 82820005-001-141D test kit.

Step 2. At the rear spar, close the refuel/defuel shut-off valve at STA 159.

Step 3. At the outboard rib, disconnect the fuel transfer tube inside the tank at STA 171 and cap the bulkhead fitting using an AN929-10 cap. Plug the holes in the two vent valves using #1 rubber stoppers.

Step 4. At the inboard rib (STA 42), plug the ends of the two vent lines using #7 rubber stoppers. Plug the four barrel nut holes using #3 rubber stoppers. Remove barrel nuts, if necessary, and re-install later.

Step 5. Install the two SD6185 dummy access covers in the upper wing skins.

Step 6. Attach the test rig pressure line to the fitting on the inboard dummy access cover.

Step 7. Pressure test according to paragraph 5.3.1.

ITEM	BLANKING KIT 82820005001-141D	DESCRIPTION
8	S/A 11	#1 rubber stopper
17	-163	SD6176 NACA duct plugs

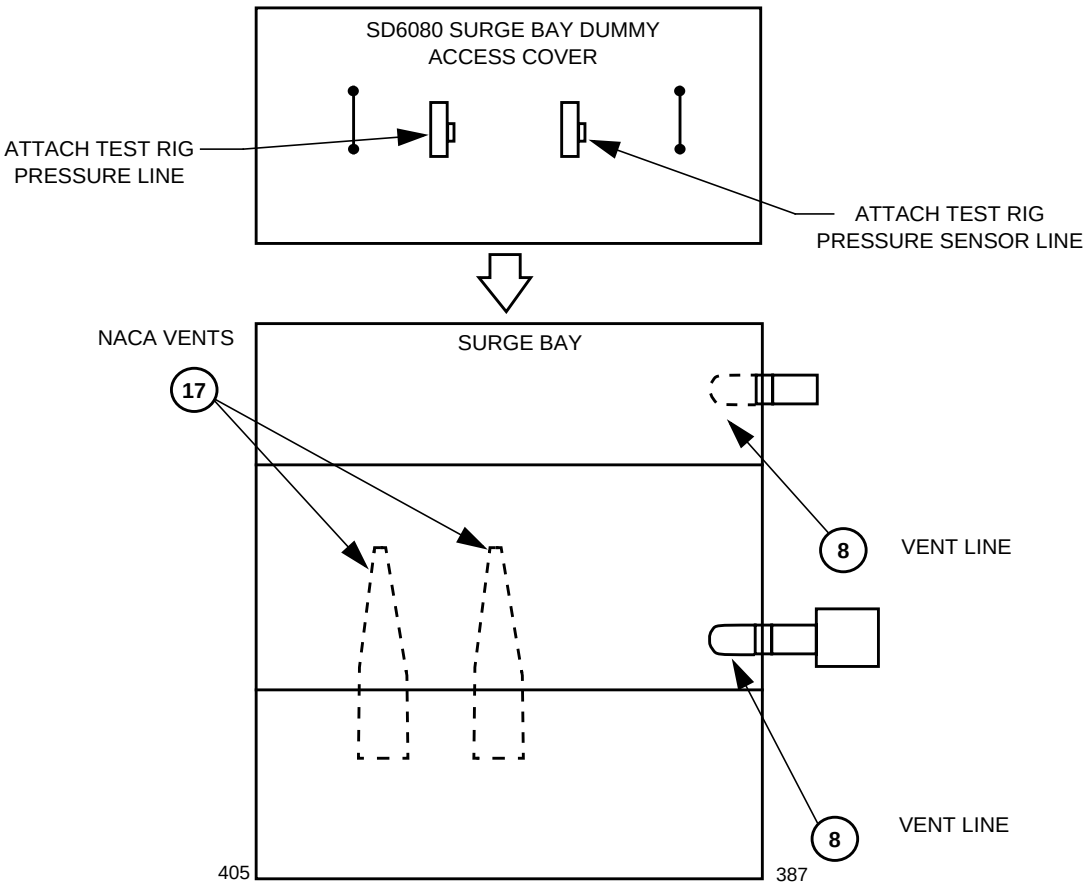
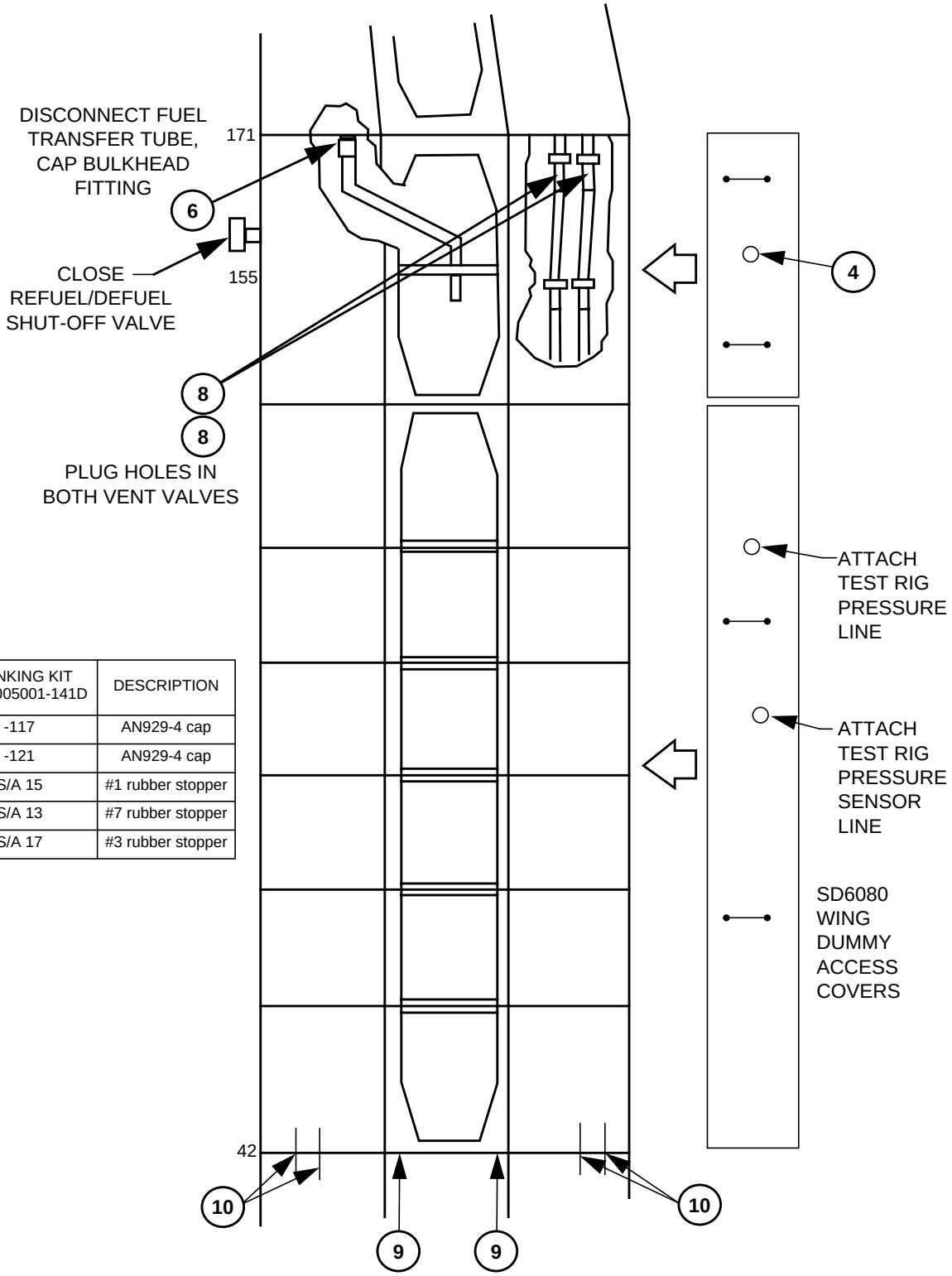


Figure 4 - First Pressure Test of Surge Bay



ITEM	BLANKING KIT 82820005001-141D	DESCRIPTION
4	-117	AN929-4 cap
6	-121	AN929-4 cap
8	S/A 15	#1 rubber stopper
9	S/A 13	#7 rubber stopper
10	S/A 17	#3 rubber stopper

Figure 5 - First Pressure Test of Auxiliary Fuel Tank

5.3 Pressure Test Procedure

5.3.1 Pressure test the main tank, surge bay or auxiliary tank as follows (see Figure 2, Figure 4 or Figure 5 respectively):

Step 1. Connect the pressure test rig to a shop air supply.

Step 2. Attach the test rig air pressure sensor line to the fitting on the inboard dummy access cover.

Step 3. Actuate the fill switch to pressurize the fuel tank to 2.0 +0.5/-0.0 psi (the red flag indicator will also indicate when the fuel tank is pressurized to 2 psi). If 2 psi cannot be achieved, switch off the fill switch and check all preparations performed in paragraph 5.2.1. After ensuring that all leaks have been repaired, pressurize the tank to 2 psi.

Step 4. Disconnect the shop air supply line to the test rig and observe the time and pressure. Perform initial leak detection and repair (if necessary) according to paragraph 5.3.2.

Step 5. Wait at least 60 minutes when testing the main tank or auxiliary tank. Wait at least 15 minutes when testing the surge bay. Check the pressure gauge for any drop in pressure.

Step 6. Perform final leak detection and repair (if necessary) according to paragraph 5.3.2.

Step 7. Release the tank pressure by actuating the dump switch.

Step 8. Remove the dummy access covers, caps, plugs, etc. installed during the preparation for pressure testing and return them to the appropriate blanking kit.

Step 9. Cover the tank access opening using the appropriate plastic dust covers.

5.3.2 Detect and repair leaks as follows:

Step 1. With the tank still pressurized, apply leak detection solution to the wing tank surface structure including the inboard and outboard ribs.

Step 2. Carefully examine the tank surface for bubbling of the solution showing leak points.

Step 3. Wash off all leak detector solution using clean water.

Step 4. Release the existing pressure in the tank by actuating the dump switch.

Step 5. Re-seal according to PPS 21.03 or tighten/replace parts, as applicable.

Step 6. Allow any applied sealant to cure.

Step 7. Repeat the first pressure test according to paragraph 5.3.1.

5.4 Final Pressure Test

5.4.1 After installation of the access covers, prepare the main fuel tank for the final pressure test as follows (see Figure 6 and Figure 7):

Step 1. Install SD6176 plugs in the NACA vent tubes in the lower wing skin and tighten until secure. Ensure the warning streamers are attached to the plugs.

Step 2. At the rear spar, close the fuel transfer shut-off valve at STA 203. Close the APU feed line shut-off valve at STA 152.

Step 3. Disconnect the engine feed line (i.e., flex hose) at the forward engine firewall. Close off the line with an AN806-10 plug and cap the engine fitting with an AN929-10 cap.

Step 4. Thoroughly check fuel tank bays and remove all test equipment, touch up primer, etc.

Step 5. Clean the fuel tanks according to PPS 4.19.

Step 6. Select the fuel tank access covers to be used on the aircraft and install on the wing according to the engineering drawings and the process sheet.

5.4.2 On extended range aircraft, both the main fuel tank and the auxiliary fuel tank will be pressurized because they are interconnected by the vent system through the surge bay.

5.4.3 Perform the final pressure test as follows (see Figure 6 and Figure 7):

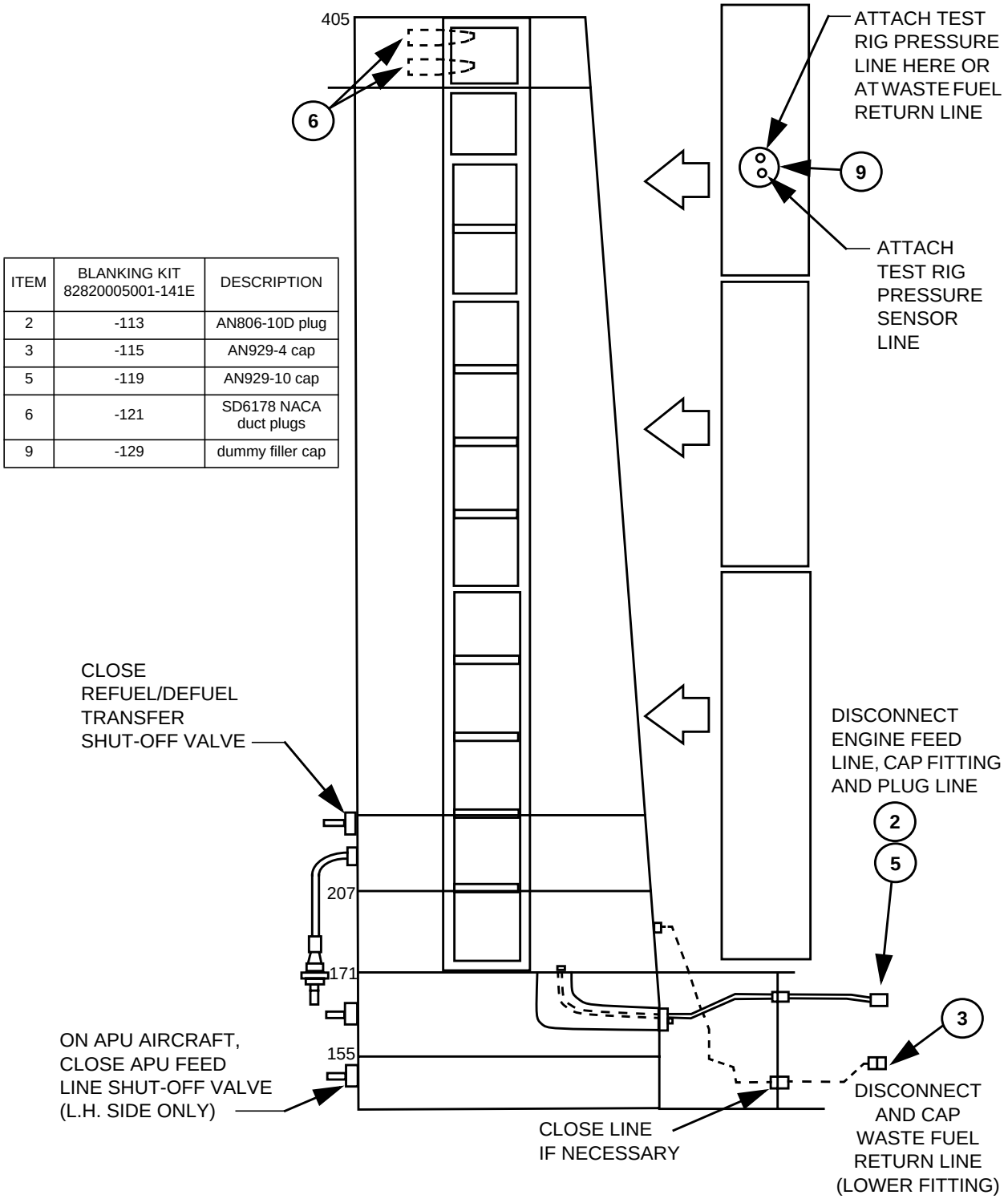
Step 1. Disconnect the waste fuel return line (i.e., flex hose) and cap it with an AN929-4 cap.

Step 2. Connect the test rig pressure line to the dummy filler cap or to the waste fuel return line. Ensure that the waste fuel return line is closed off if connecting the test rig pressure line to the dummy filler cap.

Step 3. Perform pressure testing of the main fuel tank according to paragraph 5.3.1.

Step 4. Repair leaks by re-torquing to the value specified on the engineering drawing.

Step 5. If leaks persist, release the tank pressure, remove the covers and check the seals and sealing surfaces for damage or debris. Repair or replace seals as necessary.



ITEM	BLANKING KIT 82820005001-141E	DESCRIPTION
2	-113	AN806-10D plug
3	-115	AN929-4 cap
5	-119	AN929-10 cap
6	-121	SD6178 NACA duct plugs
9	-129	dummy filler cap

Figure 6 - Final Pressure Test of Standard Aircraft

ITEM	BLANKING KIT 82820005001-141E	DESCRIPTION
2	-113	AN806-10D plug
3	-115	AN929-4 cap
5	-119	AN929-10 cap
6	-121	SD6178 NACA duct plugs
9	-129	dummy filler cap

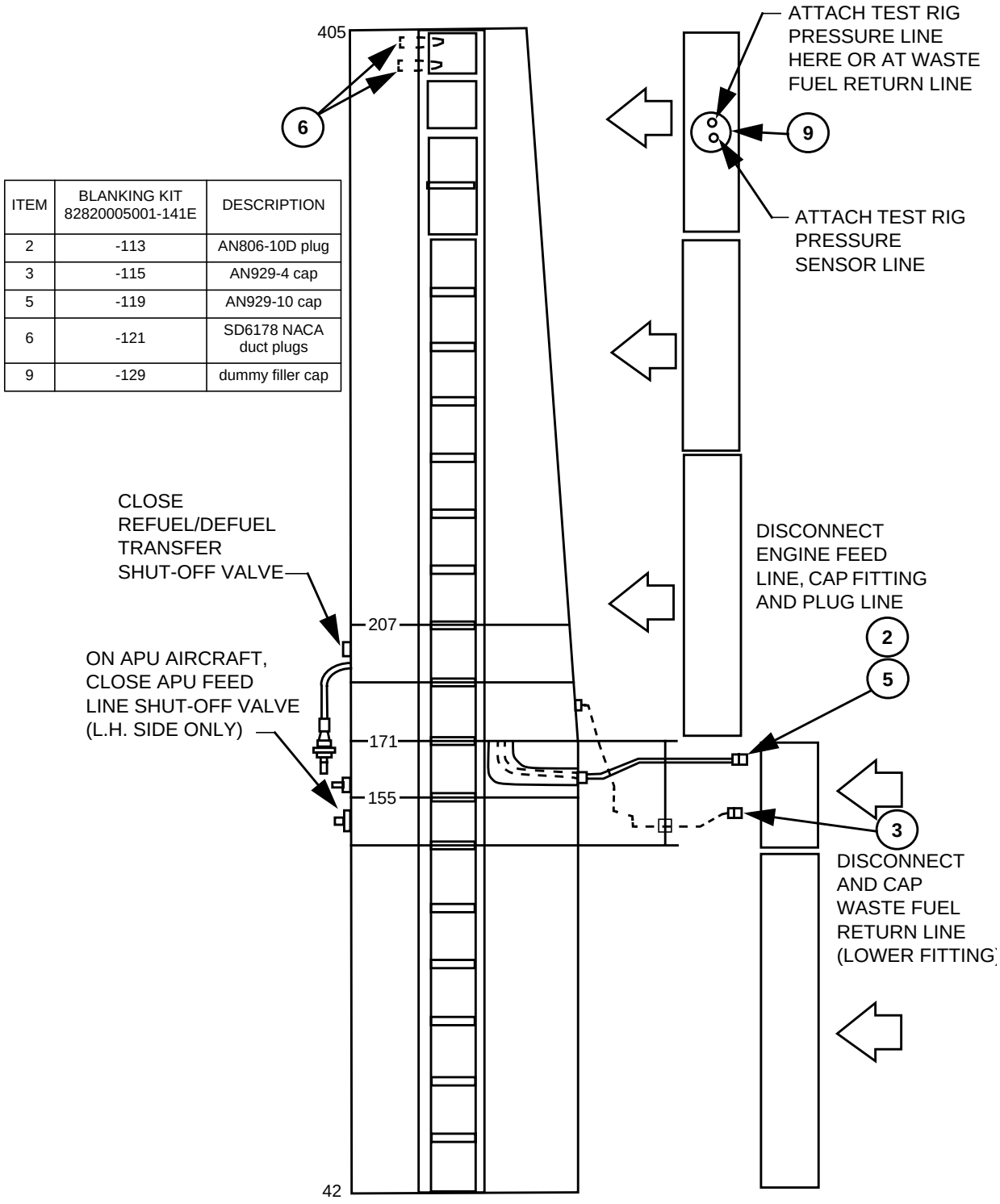


Figure 7 - Final Pressure Test of Extended Range Aircraft

5.5 Removal of Test Equipment

5.5.1 After pressure testing, disconnect test equipment as follows:

Step 1. Disconnect the pressure test rig line.

Step 2. Reconnect the waste fuel return line to the engine.

Step 3. Remove the SD6176 plugs from the NACA vent tubes.

Step 4. Remove the caps and plugs from the engine feed line.

Step 5. Reconnect the engine feed line to the engine.

5.6 Post Test Procedure

5.6.1 If specified on the engineering drawing, after pressure testing, seal all gaps between the access cover and wing structure according to the PPS specified on the drawing. Let any applied sealant cure according to the specified PPS before removing the access covers.

6 Requirements

6.1 The fuel tanks must maintain 2 psi +0.5/-0.0 for 60 minutes with no evidence of leakage. The surge bays must maintain 2 psi +0.5/0.0 for 15 minutes with no evidence of leakage.

6.2 Leak detection solution shall be used over the whole surface of the fuel tank structure when searching for leaks.

6.3 Leaks shall be repaired by sealing according to PPS 21.03, by tightening fittings according to PPS 6.03 or by replacing parts. After completing repairs, the fuel tank shall be re-tested.

6.4 During pressure testing, the pressure must not be released at any time before the removal of leak detector solution. Leak detector solution must be removed by thoroughly washing with clean water.

6.5 Material that may leave a residue (e.g., putty) shall not be used to plug holes or other openings.

7 Safety Precautions

7.1 Use extreme care at all times when pressurizing integral fuel tanks to ensure that the test rig and manometer lines are kept clear of structures, strands, etc., and free of kinks or loops which may restrict air flow through the lines.

7.2 Observe general shop safety precautions when performing the procedure specified herein.

7.3 Do not enter the wing structure (e.g., to check inboard or outboard closing ribs) until the tank has been stabilized at the specified pressure.

7.4 Do not leave the pressure test rig unattended while connected to the shop air supply.

8 Personnel Requirements

8.1 Personnel must have a good working knowledge of the applicable procedure and requirements as specified herein and must have exhibited their competency to their supervisor.

9 Maintenance of Equipment

9.1 At least once every 3 months, calibrate all gauges and pressure relief valves of the pressure test rig and check for leaks.