BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 4.19

PRODUCTION PROCESS STANDARD

Cleaning of Fuel Tanks

Issue 8
- This standard supersedes PPS 4.19, Issue 7.
- 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.

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Flow Charts

1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for cleaning of DASH 8 and Learjet Model 45 integral fuel tanks. For cleaning of fuel tanks on fuelled aircraft, refer to PPS 4.20.

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 4.20 - Cleaning of DASH 8 Fuel Tanks - Fuelled Aircraft.

3.2 PPS 13.26 - General Subcontractor Provisions.

3.3 PPS 31.17 - Solvent Usage.

4 Materials and Equipment

4.1 Materials

4.1.1 Abrasive pads (e.g., Scotch-Brite Type A Fine, 3M Canada Ltd.).

4.1.2 DSC 378-3 lint-free wiping cloths.

4.1.3 DSC 375-1 tack rag.

4.2 Equipment

4.2.1 Heavy duty electric shop-type vacuum cleaner with rubber tipped crevice-type and dusting brush attachment (e.g., Pullman Holt Model 102 CV).

4.2.2 Fresh air ventilating units fitted with 8" diameter flexible hoses and air inlet filters.

4.2.3 Paint brushes, synthetic bristle type.

4.2.4 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. Provided adequate coverage within the fuel tank will be provided, lint-free cotton or 65/35 polyester/cotton blend lab or shop coats may be substituted for coveralls.

4.2.5 Explosion proof safety lamp.

5 Procedure

5.1 General

5.1.1 The use of unauthorized materials or equipment is strictly prohibited. Store materials and equipment used for fuel tank cleaning in a lock-up area designated for this purpose.

5.1.2 The fuel tank cleaning procedures specified herein are intended to produce a sufficiently clean structure to prevent clogging of fuel filters and damage to fuel system components.

5.1.3 All personnel working within the fuel tank must wear clean coveralls, or lab or shop coats, as applicable (see Equipment section, paragraph 4.2.4).

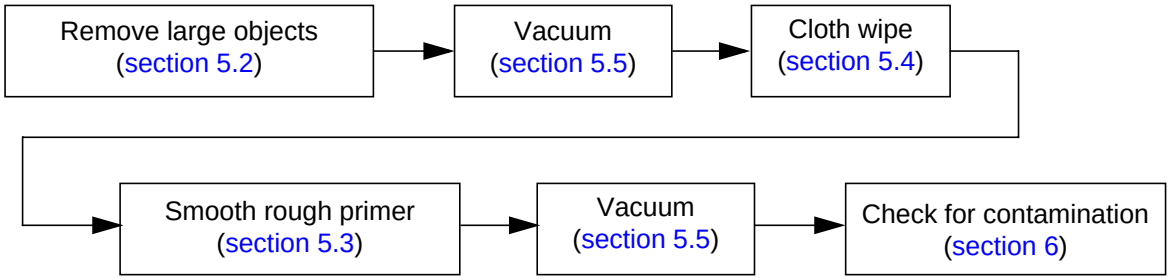
5.1.4 Clean the fuel tank structure according to Flow Chart 1 immediately before installation of the last wing skin to close the wing box assembly.

5.1.5 If pressure testing before completion of wing systems installation, clean the fuel tank to Flow Chart 2 before performing the pressure test. Clean the fuel tank to Flow Chart 3 after completion of the wing system installation and immediately before securing the fuel tank according to paragraph 5.1.7.

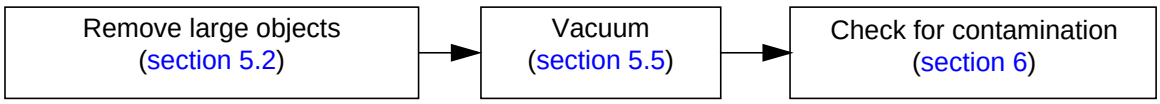
5.1.6 If pressure testing or performing further work (e.g., repairing leaks) after completion of wing systems installation, clean the fuel tank to Flow Chart 3 immediately before securing the fuel tank according to paragraph 5.1.7.

5.1.7 After successfully pressure testing the fuel tank, protect (according to section 5.8) or close (according to section 5.9) the fuel tank, as specified by the assembly manual or work order.

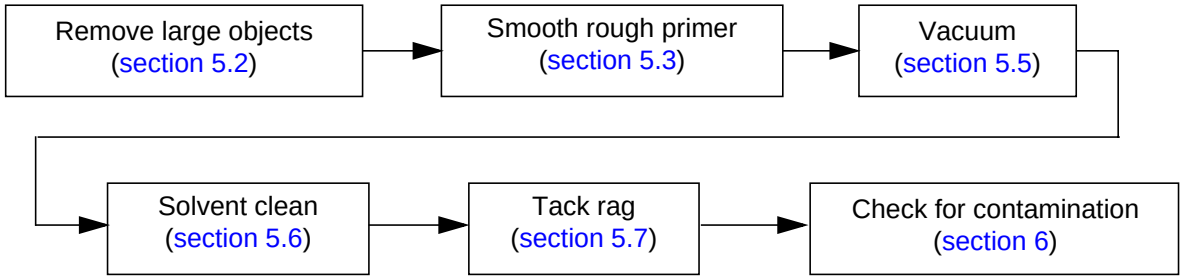
Flow Chart 1 - Cleaning before Last Wing Skin Installation



Flow Chart 2 - Cleaning before Pressure Testing



Flow Chart 3 - Final Cleaning Sequence



5.2 Removing Large Objects

5.2.1 Starting at the outboard end of the fuel tank (i.e., surge bay) and systemically working toward the inboard end, pick up all tools, Cleco's, rivets, lockbolt stems and any other large foreign objects from inside the wing box structure.

5.3 Smoothing Rough Primer

5.3.1 Check all primed surfaces for rough primer (i.e., a primed surface which will pull fibres from the cleaning cloth when wiped)

5.3.2 Smooth any rough primer by carefully abrading with an abrasive pad. Take care not to remove the primer, particularly at corners and edges.

5.3.3 Immediately after abrading with Scotch-Brite, vacuum the area to remove primer dust and abrasive pad particles.

5.4 Cloth Wiping

5.4.1 Starting at the outboard end of the fuel tank and working toward the inboard end, wipe the entire structure (including spars, ribs and upper and lower skin assemblies) with clean DSC 378-3 lint free wiping cloths. Use **only** DSC 378-3 wiping cloths as other types of wiping cloths may contaminate the fuel tank with lint.

5.4.2 Fold the wiping cloth into a ball shape. Wipe the fuel tank to remove any residual oil or lubricant and loose drill chips, swarf, etc.

5.4.3 Re-fold or replace the wiping cloth as the exposed cloth surface becomes contaminated with oil, swarf, etc.

5.4.4 Take care to avoid scratching the fuel tank primer with swarf or drill chips from the wiping cloth.

5.5 Vacuuming

5.5.1 Starting at the top (i.e., upper skin) of each fuel tank bay and working down towards the lower skin, vacuum all surfaces of the entire interior wing box structure of each bay (including spars, ribs and upper and lower skin assemblies) with a heavy duty vacuum cleaner, even if they appear clean. Much of the contamination is not visible to the naked eye.

5.5.2 Use the dusting brush attachment to help dislodge chips and swarf. The crevice-type attachment may be more useful on inside corners, under stringer steps and between rib clips.

5.5.3 Loosen adhering particles in hard-to-reach areas using a clean paint brush and sweep them towards the vacuum nozzle.

5.5.4 Dislodge drill chips loosely embedded in sealant along the rear spar using a paint brush trimmed to a bristle length of approximately 1/2".

5.5.5 Take particular care to vacuum in difficult areas such as return angles on the upper skin stringers, C-channels of fabricated ribs, small gaps between ribs and stringers, behind and under fuel system components, corners, etc.

5.5.6 Thoroughly vacuum the access cover landing, the immediate area around the tank opening and along access cover stringers.

5.6 Solvent Cleaning

5.6.1 Whenever solvent cleaning according to PPS 31.17 is specified in this PPS, use **only** DSC 378-3 lint free wiping cloths instead of the wiping cloth specified in PPS 31.17 as other types of wiping cloths may contaminate the fuel tank with lint.

5.6.2 Starting at the top of the tank structure (i.e., inside surface of the upper skin) and working towards the bottom, solvent clean exterior fuel tank surfaces according to PPS 31.17, even if they appear clean.

5.6.3 Starting at the outboard end of the fuel tank and working towards the inboard end, thoroughly solvent clean all interior fuel tank surfaces (including fuel system pipes and components) according to PPS 31.17, even if they appear to be clean.

5.6.4 Take particular care to solvent clean in difficult areas such as return angles on the upper skin stringers, C-channels of fabricated ribs, small gaps between ribs and stringers, behind and under fuel system components, corners, etc.

5.6.5 Take care at sharp edges, bolts, etc. so as not to tear the wiping cloth. Ensure that fibres are not deposited onto the structure.

5.7 Tack Ragging

5.7.1 Tack ragging is intended to remove fine particles such as lint and dust which may not be visible to the naked eye.

5.7.2 Immediately after solvent cleaning, starting at the upper skin and working down towards the lower skin, wipe all surfaces (including the fuel system pipes and components) with a tack rag, even if they appear to be clean.

5.7.3 Take particular care to wipe in difficult areas such as return angles on the upper skin stringers, C-channels of fabricated ribs, small gaps between ribs and stringers, behind and under fuel system components, corners, etc.

5.8 Protecting the Fuel Tank

5.8.1 To prevent contamination with dust, dirt, etc., cover and seal the fuel tank access holes with clean Kraft paper taped in place with masking tape.

5.9 Closing the Fuel Tank

5.9.1 Install the fuel tank access covers by fastening and torquing as specified by the engineering drawing. After closing, do not re-open fuel tanks that have been closed and sealed unless specifically authorized and under controlled conditions. If re-opening has been authorized, perform only those cleaning operations in the areas of the tank which have been specified. For example, although this PPS covers removal of contaminants ranging from large objects to very small particles, if only one section of the wing was opened and received very little contamination, it may simply be specified to tack rag in that one section. For fuelled aircraft, refer to PPS 4.20.

6 Requirements

6.1 After all cleaning operations, the fuel tank shall be checked for cleanliness. There shall be no evidence of contamination in the fuel tank. Contamination consists of swarf, loose drill chips, dust, lint or cloth fibres inside the fuel tank. Drill chips firmly embedded in sealant are not unacceptable.

7 Safety Precautions

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

7.2 Refer to PPS 31.17 for the safety precautions for solvent cleaning.

7.3 Arrange fresh air ventilating units to provide a steady stream of fresh air to the operator.

7.4 Only use explosion proof safety lamps inside fuel tanks.

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 the start of each shift during which fuel tank cleaning will be performed, empty the vacuum cleaner canister and shake the filter bag clean.

9.2 Replace the fresh air ventilating unit filters when they become dirty.