

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS		ENGINEERING REPORT ORDER		NUMBER # 148	
TITLE SERVICE LETTER #148 FAA APPROVED		☒		MODEL SEE BELOW	
		BY Jim Hirsch		CHK'D LS	
		DATE 6/24/96		SERIAL SEE BELOW	
				PAGE OF 1 2	

SUBJECT

Fuel Contamination

MODELS

All Air Tractor Models

SUMMARY

We have become aware of several instances where fuel contamination is believed to have possibly contributed to loss of engine power in Air Tractor aircraft. Turbine operators are reminded that in the event of an engine flame out, to turn the ignitor on continuous and turn on the boost pump as outlined in the flight manual. As we all know, it is of utmost importance to maintain a clean fuel system in your aircraft. It is also just as important to acquire clean fuel and maintain clean storage facilities.

Air Tractor aircraft fuel systems are relatively simple and easy to maintain. Pilots are urged to activate all the low point drains, as part of each day's preflight action. Be sure to use a clean sump cup and check it for water and other foreign materials at each sump point. If water or foreign materials are found be sure they are completely removed from the fuel system of the aircraft before flight. Be sure to replace the firewall mounted fuel filter and clean all the fuel screens as recommended in the Owners Manual. Operators of turbine powered models equipped with the Weldon Electric Boost Pump should also be sure that the bypass valve in the fuel pump is cleaned, as suggested by the pump manufacturer.

Turbine operators need to be on the lookout for microorganism contamination in both the aircraft fuel system and fuel storage facilities. Bacteria and fungi, commonly known as HUM-Bugs, are identified as dark brown or dark green to black slimy substances in the fuel system. They are often found in the fuel filter, fuel tanks, header tank and fuel valve assembly. These organisms grow at the fuel and water bottom layer. HUM-Bugs feed on fuel, water and some organic compounds found in tank sealers. Byproducts of their feeding and reproduction are water, acid and sludge. The acid produced leads to rapid corrosion of tank walls and degradation of sealants and rubber hoses. Often small amounts of organisms will be detectable when low points drains are activated and a small sample of fuel is obtained in a clean cup and inspected. Sometimes a rotten egg smell will be present from a fuel tank that is infected with organisms. Commercial detection kits are also available that will allow the operator to test fuel for contamination.

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS		ENGINEERING REPORT ORDER ☒		NUMBER # 148	
TITLE SERVICE LETTER #148 FAA APPROVED		BY Jim Hirsch		CHK'D LS	
		DATE 6/24/96		MODEL SEE BELOW	
				SERIAL SEE BELOW	
				PAGE OF 2 2	

If you find that your aircraft fuel system is contaminated with organisms, simply adding an organism killer may not be the best remedy. If the organisms die and are released from tank walls, the dead organisms may clog fuel filters, screens, or fuel lines.

If your fuel system is contaminated, the fuel system should be disassembled and carefully cleaned before further flight. In some instances it may be necessary to open the fuel tank inspection covers and mechanically clean the inside of the fuel tanks. The header tank may need to be removed and carefully cleaned or replaced. The header tank should be removed cleaned and inspected at least every two years.

If you have bulk fuel storage, it is as important to maintain the bulk storage system as it is the fuel system of the aircraft. Be sure that you are buying your fuel from a reputable dealer. You may consider requesting that your supplier provide written certification of the product delivered. Be sure that your storage tanks have a low point drain and activate the drain regularly. Check that the tank is positioned so that the drain is at the low point of the tank and that there are no other low points that might be water traps. The delivery system, from the storage tank, should have a good filter and water separator in line. Keep the filter changed regularly and periodically drain the water separator.

Whenever your aircraft is to be stored for an extended period of time, be sure to add an approved antibacterial product to the fuel system in accordance with the manufacturers instructions. Be sure to run the engine for a short period of time after adding the solution to ensure that it is distributed throughout the fuel system. It is best to store the airplane with the fuel tanks full to help minimize the formation of water condensate in the fuel tanks.

Remember that a high quality fuel supply is one of the keys to many hours of safe and trouble free flight. We urge you to closely monitor your fuel supply, fuel storage, and aircraft fuel systems.

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS	ENGINEERING REPORT ORDER X		NUMBER SL #229
TITLE Service Letter #229 (FAA APPROVED)	BY Mike Rhodes	CHK'D JH	MODEL See Below
	DATE 6/3/03		SERIAL See Below
			PAGE 1 OF 2

SUBJECT

Replacement Fuel Filter Element, Air Tractor part no. 52351-1.

MODELS

All turbine models AT-302, AT-400, AT-400A, AT-402, AT-402A, AT-402B, AT-502, AT-502A, AT-502B, AT-503, AT-503A, AT-602, AT-802, AT-802A

All Serial Numbers

**ENGINEERING ASPECTS OF THIS
SERVICE LETTER ARE FAA APPROVED**

SUMMARY

Air Tractor is now manufacturing the p/n 52351-1 filter element as a **direct replacement to** the Fram CS1133PL filter element.

The manufacturing process of the Fram CS1133PL filter element has been changed, degrading the flow performance and service life of the element. The current production Fram CS1133PL fuel filter elements are no longer a suitable replacement for the factory installed fuel filters.

REMOVAL and INSTALLATION PROCEDURE

1. Gain access to firewall fuel filter assembly.
2. Drain filter bowl by removing the 1/8" pipe plug in the bottom of the bowl.
3. Loosen center nut on top of the filter assembly.
4. Remove metal bowl.
5. Check bowl for water, rust, and other contaminants.
6. Clean filter bowl using kerosene, Jet A, or mineral spirits.
7. Discard Fram CS1133PL filter element and replace with Air Tractor p/n 52351-1 filter element.
8. Reassemble and install filter assembly with new seal (Fram P/N SP238629).
9. Torque bolt to 12 - 14 ft-lb.
10. Install safety wire.
11. Leak check by running electric boost pump.

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS	ENGINEERING REPORT ORDER X		NUMBER SL #229	
TITLE Service Letter #229 (FAA APPROVED)	BY Mike Rhodes	CHK'D JH	MODEL See Below	
	DATE 6/3/03		SERIAL See Below	
	PAGE 2 OF 2			

MAINTENANCE PROCEDURE

The Air Tractor p/n 52351-1 filter element should be inspected for general condition **every 100 hours** as follows:

1. Remove fuel filter element.
2. Inspect soldered seams and joints for security and seal.
3. Inspect gaskets to ensure they are firmly attached and in good condition. Gaskets shall be free of nicks or cuts and have a uniform flat sealing surface.
4. Inspect element screen for holes, tears, or non-uniform weave. Screen mesh weave shall be uniform and shall show no signs of holes or tears.
5. Inspect element for evidence of crushing damage. Measure length of filter with a tape or ruler. The length from metal surface to metal surface shall be 4 1/2 inches $\pm$ 1/16 inches.
6. Any filter element that does not satisfactorily meet the condition inspection above should be discarded and replaced with a new filter element.
7. Clean filter with kerosene, Jet A, or mineral spirits. Contaminants will collect on outside of filter. Compressed air can be used (90psi maximum) to loosen particles if necessary (blow from the center of the filter out).
8. Install filter element with new seal (Fram P/N SP238629).

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS	ENGINEERING REPORT ORDER		NUMBER	229A	
			MODEL	SEE BELOW	
	TITLE SERVICE LETTER #229A FAA APPROVED	BY M. Leemann	CHK'D JH	SERIAL	SEE BELOW
		DATE 1/19/2011		PAGE 1	OF 4

SUBJECT

Fuel Filter Element Inspection and Maintenance

The technical content of this service letter has been FAA approved.

APPLICABILITY

All turbine engine model aircraft AT-302, AT-400, AT-400A, AT-402, AT-402A, AT-402B, AT-502, AT-502A, AT-502B, AT-503, AT-503A, AT-504, AT-602, AT-802, AT-802A

All serial numbers.

SUMMARY

Air Tractor aircraft with turbine engines now have multiple approved fuel filters that may be installed into the fuel system. These options are dependent upon the model of the aircraft. The installation for the fuel filters applicable to each model aircraft have been designed to be interchangeable. Table 1 below shows the fuel filter options that may be installed on each model. If the Fram fuel filter is currently installed on aircraft, it is not required to replace it with an Air Tractor p/n 53114-1 or 53114-2 fuel filter. Inspection and Maintenance for all fuel filters is required.

Table 1	
Aircraft Models	Fuel Filter Part Number
AT-302, AT-400, AT-400A, AT-402, AT-402A, AT-402B, AT-502, AT-502B, AT-503, AT-503A, AT-504, AT-802, AT-802A	Fram CS1133PL, Air Tractor 53114-1, or
AT-502A, AT-602	Fram CS1133PL, Air Tractor 53114-2, or

Beginning in January of 2011, Air Tractor will be installing the Air Tractor 53114-1 and 53114-2 fuel filters onto production aircraft. These fuel filters will also be available for purchase for installation in the field. The Fram CS1133PL, Air Tractor 53114-1, and 53114-2 fuel filter assemblies all use the Air Tractor p/n 52351-1 fuel filter element.

INTERCHANGEABILITY

The Air Tractor 53114-1 and 53114-2 fuel filters were designed to mimic the design of the Fram CS1133PL fuel filters. The applicable Air Tractor fuel filter is available to install on turbine engine

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS	ENGINEERING REPORT ORDER	NUMBER 229A
TITLE SERVICE LETTER #229A FAA APPROVED	BY M. Leemann	MODEL SEE BELOW
	DATE 1/19/2011	SERIAL SEE BELOW
	PAGE 2 OF 4	

aircraft. Once received from Air Tractor, the applicable fuel filter may replace the existing fuel filter assembly as follows.

1. Gain access to the firewall and fuel filter assembly.
2. Drain fuel filter bowl by removing the 1/8" pipe plug in the bottom of the bowl.
3. Disconnect fuel filter attach bracket from firewall. Save nuts and bolts.
4. Note orientation of "Inlet" and "Outlet" on fuel filter cap. Remove elbow fittings from fuel filter. Clean Rectorseal from fittings with Toluene. Wipe Toluene from fittings and allow fittings to dry.
5. Apply Rectorseal No. 5 to fittings and install fittings into Air Tractor fuel filter cap. Be sure to install the fittings into the cap as they were removed from the Fram filter cap. Ensure orientation of "Inlet" and "Outlet" is the same.
6. Attach fuel filter to firewall with nuts and bolts from Step 2.
7. Perform a leak check by running the electric boost pump.

INSPECTION AND MAINTENANCE

Each approved fuel filter must be inspected for condition once every 100 hours TIS. Procedures for disassembly, inspection, and installation for each filter are very similar. The Fram fuel filter has a pipe plug at the bottom of the bowl. The Air Tractor fuel filters have a drain valve at the bottom of the bowl.

Fram CS1133PL Inspection and Maintenance

Air Tractor manufactures the p/n 52351-1 fuel filter element as a direct replacement to the Fram CS1133PL fuel filter element. The manufacturing process of the Fram CS1133PL fuel filter element has been changed, degrading the flow performance and service life of the element. The past production Fram CS1133PL paper fuel filter elements are no longer a suitable replacement for the factory installed fuel filters. Effective Oct. 22, 2002, Air Tractor has removed the Fram filter element of the Fram CS1133PL fuel filter and replaced it with the Air Tractor p/n 52351-1 element prior to installation onto production aircraft.

Removal of Fram CS1133PL element and installation of 52351-1 element

1. Gain access to the firewall and fuel filter assembly.
2. Drain fuel filter bowl by removing the 1/8" pipe plug in the bottom of the bowl
3. Remove safety wire. Loosen the center bolt on top of the fuel filter assembly.

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS	ENGINEERING REPORT ORDER	NUMBER 229A
TITLE SERVICE LETTER #229A FAA APPROVED	BY M. Leemann	MODEL SEE BELOW
	DATE 1/19/2011	SERIAL SEE BELOW
	PAGE 3 OF 4	

4. Remove metal bowl.
5. Check bowl for water, rust, and other contaminants.
6. Clean fuel filter bowl using kerosene, Jet A, or mineral spirits.
7. Discard Fram CS1133PL filter element and replace with Air Tractor p/n 52351-1 filter element.
8. Reassemble and install fuel filter assembly with new seal beneath cap (Fram p/n SP238629).
9. Torque center bolt on top of fuel filter assembly to 12 – 14 ft.lbs. (144 – 168 in.lbs.).
10. Install safety wire.
11. Perform a leak check by running the electric boost pump.

The Air Tractor p/n 52351-1 fuel filter element should be cleaned and inspected for general condition every 100 hours TIS as follows:

1. Remove the Air Tractor p/n 52351-1 fuel filter element.
2. Clean filter with kerosene, Jet A, or mineral spirits. Contaminants will collect on the outside of the filter. Compressed air can be used (90 psi maximum) to loosen particles if necessary (blow from the center of the filter out).
3. Inspect soldered seams and joints for security and seal.
4. Inspect gaskets to ensure that they are firmly attached and in good condition. Gaskets shall be free of nicks or cuts and have a uniform flat sealing surface.
5. Inspect element screen for holes, tears, or non-uniform weave. Screen mesh weave shall be uniform and shall show no signs of holes or tears.
6. Inspect element for evidence of crushing damage. Measure length of filter with a tape or ruler. The length from metal surface to metal surface shall be 4 1/2 inches $\pm$ 1/16 inches.
7. Any filter element that does not satisfactorily meet the condition inspection above should be discarded and replace with a new filter element.
8. Install filter element with new seal beneath cap (Fram p/n SP238629).

Air Tractor 53114-1 and 53114-2 Inspection and Maintenance

The Air Tractor p/n 52351-1 fuel filter element, used in both the p/n 53114-1 and 53114-2 fuel filter assemblies, should be inspected for general condition every 100 hours TIS as follows:

1. Gain access to the firewall and fuel filter assembly.
2. Drain fuel filter bowl by opening the drain cock at the bottom of the filter bowl.
3. Remove safety wire. Loosen the center bolt on top of the fuel filter assembly.

SNOW ENGINEERING CO. WICHITA FALLS, TEXAS	ENGINEERING REPORT ORDER <table border="1" data-bbox="971 149 1027 218"> <tr><td> </td></tr> <tr><td> </td></tr> </table>			NUMBER 229A
TITLE SERVICE LETTER #229A FAA APPROVED	BY M. Leemann	MODEL SEE BELOW		
	DATE 1/19/2011	SERIAL SEE BELOW		
	PAGE 4 OF 4			

4. Remove metal bowl.
5. Check bowl for water, rust, and other contaminants.
6. Clean fuel filter bowl using kerosene, Jet A, or mineral spirits.
7. Fuel filter element inspection:
 - i) Remove the Air Tractor p/n 52351-1 fuel filter element.
 - ii) Clean filter with kerosene, Jet A, or mineral spirits. Contaminants will collect on the outside of the filter. Compressed air can be used (90 psi maximum) to loosen particles if necessary (blow from the center of the filter out).
 - iii) Inspect soldered seams and joints for security and seal.
 - iv) Inspect gaskets to ensure that they are firmly attached and in good condition. Gaskets shall be free of nicks or cuts and have a uniform flat sealing surface.
 - v) Inspect element screen for holes, tears, or non-uniform weave. Screen mesh weave shall be uniform and show no signs of holes or tears.
 - vi) Inspect element for evidence of crushing damage. Measure length of filter with a tape or ruler. The length from metal surface to metal surface shall be 4 1/2 inches $\pm$ 1/16 inches.
 - vii) Any filter element that does not satisfactorily meet the condition inspection above should be discarded and replace with a new filter element.
8. Reassemble and install fuel filter assembly with new seal beneath cap (Fram p/n SP238629).
9. Torque center bolt on top of fuel filter assembly to 12 – 14 ft.lbs. (144 – 168 in.lbs.).
10. Install safety wire.
11. Perform a leak check by running the electric boost pump.

Fly Safe Campaign



MAINTAIN ACCIDENT AWARENESS

Don't become a statistic!

NTSB has reported 5 ag accidents including 1 fatal accident so far this year.

AVOID ENGINE FUEL SYSTEM CONTAMINATION

NTSB has seen several ag aircraft fuel contamination issues recently. Ag aircraft are subject to numerous situations that could result in contamination to the engine fuel system such as unclean fuel storage facilities, aircraft washing, loading, refueling, and maintenance; and/or operating/storing the aircraft outside in condensation/rain. Contamination could be from a variety of sources such as chemicals, debris from the aircraft and maintenance work, or dirt, dust, microbial growth, rust, sand, and water. Contamination of an engine fuel system could result in either a partial or a complete loss of engine power.

Turbine engine components that could be adversely affected by contamination include the fuel control unit and the fuel nozzles. According to FAA AC 20-43, turbine engine fuel controls and pumps are more sensitive than piston engine fuel systems. Their fuel feed and pumping systems must work harder, tolerances are closer and fuel pressures are higher. Fine contaminants may block fuel supply systems and erode critical parts of engine and fuel control systems. Due to the nature of aerial application work, operators should consider increasing the inspection frequency of turbine engine fuel system components. Always follow the maintenance manual when performing your work. Consult with the airframe, the engine, and the engine accessory manufacturers on any additional service documents regarding the topic of fuel contamination.

Here are additional resources on fuel contamination:

- [Air Tractor, Service Letter #148, Fuel Contamination](#)
- [Thrush Aircraft, Service Letter SL-AG-127, Aircraft Servicing and Fuel System Best Practices](#)
- [Federal Aviation Administration, Advisory 20-43C Aircraft Fuel Control](#)
- [Federal Aviation Administration, Advisory 20-125 Water in Aviation Fuels](#)
- [National Transportation Safety Board, Safety Alert SA-079 Fuel Providers: Prevent Diesel Exhaust Fluid Jet Fuel Contamination](#)

Check Temporary Flight Restrictions (TFRs)

Always check TFR NOTAMS before flying! Make sure you have proof of a preflight TFR briefing from sources such as FSS or <https://www.1800wxbrief.com>.

Make a "Fly Safe" Resolution Now!

Watch your fax or e-mail every other Monday in April and May and every Monday in June, July, and August for scheduled issues. Supplemental messages may be sent when additional safety awareness is warranted. To be removed from the "Fly Safe" fax list, please call 202-546-5722 or e-mail information@agaviation.org. Let us know if you wish to be removed only from these Fly Safe messages or all faxes or e-mails from the NAAA.