



652 Oliver Street
Williamsport, PA. 17701 U.S.A.

Tel. 570-323-6181
Fax. 570-327-7101
www.lycoming.com

SERVICE INSTRUCTION

DATE: February 4, 2011 Service Instruction No. 1530
Engineering Aspects are
FAA (DER) Approved

SUBJECT: Engine Inspection in Particulate-Laden Environments (Volcanic Ash, Sand, Dust, Airborne Debris)

MODELS AFFECTED: All Lycoming aircraft engines.

TIME OF COMPLIANCE: Immediately after flight or ground operation in particulate-laden atmospheres

NOTE

Incomplete review of all the information in this document can cause errors. Read the entire Service Instruction to make sure you have a complete understanding of the requirements

This service instruction gives guidelines for operation, inspection, and service of Lycoming engines which have been operated in atmospheres that have particulate matter such as dust, sand, debris, and volcanic ash.

Inlet air which contains volcanic ash or other particulates can cause damage to piston engines. Solid deposits can collect on engine baffles or other engine surfaces to prevent engine cooling. Accumulation of deposits on the induction air filter can prevent air flow to the engine and decrease engine power.

If deposits get into the engine oil, engine malfunction and/or failure can occur from abrasive wear.



CAUTION

DO NOT USE WATER INITIALLY TO REMOVE VOLCANIC ASH. WHEN VOLCANIC ASH COMES INTO CONTACT WITH WATER, IT CAN BECOME A HARDENED, CORROSIVE COMPOUND.

NOTE

Given the dynamic conditions of volcanic ash, Lycoming recommends that engines not be operated in areas where volcanic ash is seen in the air or on the ground. Ash on the ground and runways can inadvertently get into the engine compartment and cause engine damage during landing or take-off.

However, if during flight, the engine is in a particulate laden atmosphere, do the following:

1. Monitor the engine temperature during flight. (Damaged or blocked cooling baffles or heavy deposits on engine cooling surfaces can decrease cooling efficiency and cause the engine to overheat.)
2. If the engine is not operating smoothly in flight, make a safe landing as soon as possible. Identify and repair the cause of rough operation.



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In the event that the engine has been in particulate-laden atmospheres, especially volcanic ash clouds or with ash on the ground, Lycoming recommends that you do all of the standard actions shown in Table 1.

Table 1.	
Action to Take for Engines Operated in Particulate Laden Atmosphere	
After Flight	Wear personal protective equipment (gloves, respiratory, and eye protection). Per the airframe manufacturer's instructions, thoroughly remove the ash or particulate from the aircraft by hand brushing or air/vacuum. Make sure that all ash is removed from the engine, nacelle and cowling.
	Do a post-flight inspection. Particularly, examine the induction filters, induction system, and engine baffles for blockage or damage.
	Immediately, do an oil change, collect an oil sample and have a spectrographic analysis done on the oil sample. Compare this analysis with past oil analyses to identify engine wear or contamination.
	Replace the oil filter and intake air filter to remove any internal contamination that can cause premature wear because of the highly abrasive effects of most solid particles.
	Examine the external condition of the engine, all accessories, compressor and turbine blades, external fuel and oil cooling air baffles, oil lines, and all other components for corrosion or scoring. Identify any possible damage caused by the high speed impact of solid particles and corrosive effects caused by the chemical composition of volcanic ash.
	Drain all other fuel/fluids from the engine and replace with clean fluids. Remove and clean fuel inlet screen
	Examine seals for damage and leaks. Replace damaged or leaky seals.
	Clean the engine with high pressure air spray. Be sure to clean the cooling fins on the cylinders.
	In volcanic ash fall-out or high sand or dust areas, after the engine cools, install inlet and exhaust covers to prevent airborne volcanic ash from entry into the static engine.
After 10 hours of operation or the next flight	Wear personal protective equipment. Examine the external engine, cowling, and nacelle for any particulate or ash residue. Remove any particulate or ash residue per the airframe manufacturer's instructions.
	Do a pre-flight inspection.
	Do an oil change and collect another oil sample for spectrographic analysis. Compare the results against the last oil sample to identify engine wear or effects of contamination. As a precaution, do another oil change and analysis of a sample again, as necessary.
	Replace the oil filter and intake air filter as a precaution to be sure there are no effects of particulate contamination. Replace these components again after the next flight, as necessary.
	Examine the external condition of the engine, all accessories, compressor and turbine blades, external fuel and oil cooling air baffles, oil lines, and all other components for corrosion or scoring. Identify any possible damage caused by the high speed impact of solid particles and corrosive effects caused by the chemical composition of the volcanic ash. Do this inspection again as necessary.
	Remove and examine the fuel inlet screen for remnants of contamination. Clean if contamination is found.
	Monitor oil temperature and pressure for indications of engine problems.

NOTE

Additional measures may be necessary in specific operating conditions.

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