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SERVICE INSTRUCTION

DATE: December 29, 2010

Service Instruction No. 1427C
(Supersedes Service Instruction No. 1427B)
Engineering Aspects are
FAA (DER) Approved

SUBJECT: Lycoming Reciprocating Engine Break-In and Oil Consumption
MODELS AFFECTED: All fixed wing and rotary wing aircraft (horizontal installations only) with
Lycoming reciprocating aircraft engines installed
TIME OF COMPLIANCE: After field overhaul

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.

Background

This Service Instruction identifies the necessary steps for engine break-in, including engine preparation for ground operational tests, flight tests, after-flight tests, and oil consumption limits for Lycoming engines installed in fixed wing and rotary aircraft.

NOTE

Engine overhaul includes, but is not limited to, replacing applicable components such as: fuel pump, fuel metering unit, and magnetos, if applicable, with components that are overhauled, rebuilt, or new.

Ideally, this procedure is to be done in a test cell where operating conditions can be closely monitored. If the engine is operated in a test cell, the engine must have intercylinder baffles, a cooling shroud, and a test club installed for engine Revolution Per Minute (RPM) requirements. If a test cell is not available, use a test stand with a test club and a cooling shroud for the engine test.

If a test cell or a test stand is not available, do an engine test after the engine has been installed in the aircraft with the intercylinder baffles installed. If the engine is operated in the aircraft, use a test club or aircraft propeller for correct air flow cooling. The engine-to-cowling baffles must be new or in good condition for correct cooling air flow differential across the engine. The cylinder head temperature gage, oil temperature gage, oil pressure gage, manifold pressure gage and tachometer must be calibrated for accuracy.

The purpose of a test cell or ground run test if done with the engine installed in the aircraft is to make sure that the engine is in compliance with all specifications, RPM, manifold pressure, fuel flow and oil pressure. The oil cooler system must hold oil temperatures within limits shown in the applicable Lycoming Operator's Manual.



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The purpose for this engine break-in procedure is for correct piston ring seating and stable oil consumption on a top overhauled engine or a newly overhauled engine that is installed in the aircraft.

NOTE

The following formula is used to calculate the maximum allowable oil consumption limits for all Lycoming aircraft engines.

$$0.006 \times \text{BHP} \times 4 \div 7.4 = \text{Qt./Hr.}$$

1. **FIXED WING**

A. PREPARATION FOR GROUND OPERATIONAL TEST WITH ENGINE INSTALLED IN AIRCRAFT

NOTE

Refer to the latest revision of Service Instruction 1014 for the recommended oil to be used for engine break-in on Lycoming engine models. In most cases, turbocharged engines are to use ashless dispersant oil for break-in. Non-turbocharged engines are to use aviation grade mineral oil for break-in. Follow Service Instruction 1014 to use the correct oil for break-in.

1. Do the engine pre-oil in accordance with the latest revision of Service Instruction No. 1241.
2. Calibrate the cylinder head temperature gage, oil temperature gage, oil pressure gage, manifold pressure gage, and tachometer before the ground operational test.



CAUTION

MAKE SURE THAT ALL VENT AND BREATHER LINES ARE INSTALLED CORRECTLY AND ARE SECURELY IN PLACE IN ACCORDANCE WITH THE AIRFRAME MAINTENANCE MANUAL.

3. Install all airframe baffles and cowling
4. For optimum cooling during the ground operational test, use a test club. If the test club is not available, use the regular flight propeller, however, monitor the cylinder head temperature closely.

B. GROUND OPERATIONAL TEST

NOTE

Before the ground operational test, the oil cooler system must not have any air locks.

If the engine had failed before overhaul, it is possible that the oil cooler, propeller and governor could have been contaminated. During overhaul, these parts were to either be replaced or cleaned and examined by an approved repair facility.

1. Before the start of the ground operational test, examine the oil cooler, propeller, and governor for metal contamination. These parts must be clean and free of contamination before the ground operational test can begin.
2. Put the aircraft in a position facing the wind.
3. Start the engine and look at the oil pressure gage. If sufficient oil pressure indication is not shown within 30 seconds, stop the engine. Identify and correct the cause.

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4. If oil pressure is sufficient, operate the engine at 1000 RPM until the oil temperature is stable or is at 140°F (60°C). After warm-up, the oil pressure is not to be less than the minimum specified pressure in the applicable Lycoming Operator's Manual.
5. Increase engine speed to 1500 RPM and operate at that speed for 15 minutes.
6. Make sure the cylinder head temperature, oil temperature and oil pressure is within the specified limits in the Lycoming Operator's Manual.

NOTE

Extended ground operation can cause excessively high cylinder and/or oil temperatures.

NOTE

If any malfunction occurs, stop the engine and let it cool. Identify and correct the cause before continuation of the ground operational test.

- a. Start the engine again and monitor oil pressure.
- b. Increase engine speed to 1500 RPM for 5 minutes.
7. If the engine has magnetos, measure the magneto drop-off as described in the latest revision of Service Instruction No. 1132.
8. Do a cycle of the propeller pitch and a feathering check as applicable as per the airframe manufacturer's recommendations.
9. Operate the engine to full-static aircraft recommended power for up to 10 seconds.
10. After engine operation at full power, slowly decrease the RPM to idle and let the engine stabilize.
11. Do a check of the idle mixture adjustment before engine shutdown.
12. Examine the engine for oil, fuel, and hydraulic fluid leaks. Identify and correct the cause of any leaks
13. Remove the oil suction screen and the oil pressure screen or oil filter to look for any blockage or contamination. If no blockage or contamination is found, a flight test can be done. If blockage or contamination is found, change the oil. Remove the blockage and contamination. Refer to the latest revision of Service Bulletin No. 480 for instructions.

C. FLIGHT TEST.



WARNING

REPLACE ENGINE TEST CLUBS WITH APPROVED FLIGHT PROPELLERS BEFORE THE FLIGHT TEST.

1. Start the engine and do a preflight run-up in accordance with the applicable manufacturer's Pilot's Operator's Handbook (POH).
2. Do a full power take-off in accordance with the POH.
3. Monitor engine RPM, fuel flow, oil pressure, oil temperature and cylinder head temperature during takeoff.
4. As soon as possible, decrease the engine speed to climb power in accordance with the POH.

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