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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**

C. 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.

5. Do a shallow climb angle to a suitable cruise altitude.

6. Adjust the mixture per the POH.

7. At cruise altitude, decrease power to approximately 75% and continue flight for 2 hours. For the second hour, do power settings alternating between 65% and 75% power as per the applicable POH.

NOTE

For correct piston ring seating, in a top overhauled engine or a newly overhauled engine, operate the aircraft at 65% to 75% cruise power until oil consumption is stable.

For a normally aspirated (non-turbocharged) engine, it will be necessary to operate at cruise power at the lower altitudes. Density altitude in excess of 8,000 feet (2438 m) will prevent the engine from reaching sufficient cruise power for an acceptable break-in; 5,000 feet (1524 m) is recommended.

If oil consumption is not stable, look for oil leaks. Identify and correct the cause of the leak(s).

8. If the engine and aircraft are operating to correct specifications per the Lycoming Operator's Manual, increase engine power to the maximum airframer recommendations and hold for 30 minutes.



CAUTION

FOR ENGINES THAT HAVE DYNAMIC COUNTERWEIGHT ASSEMBLIES, DO NOT OPERATE AT LOW MANIFOLD PRESSURE DURING HIGH ENGINE SPEEDS UNDER 15 IN. HG AND RAPID CHANGES IN ENGINE SPEEDS. THESE CONDITIONS CAN CAUSE DAMAGE TO THE COUNTERWEIGHTS, ROLLERS OR BUSHINGS, AND CAUSE DETUNING.

9. Decrease altitude at low cruise power and closely monitor the engine instruments. Do not do long descents at low manifold pressure. Do not decrease altitude too rapidly. The engine temperature could decrease too quickly.



CAUTION

DO NOT DO CLOSED THROTTLE DESCENTS. CLOSED THROTTLE OPERATION DURING DESCENTS WILL CAUSE RING FLUTTER WHICH CAN CAUSE DAMAGE TO THE CYLINDERS AND RINGS.

10. After landing and shutdown, examine the engine for oil, fuel, and hydraulic fluid leaks. Identify and correct the cause of any leaks.
11. Calculate fuel and oil consumption and compare the limits given in the applicable Lycoming Operator's Manual. If the oil consumption value is above the limits in the manual, identify and correct the cause. Do this flight test again, up to and including this step before releasing the aircraft for service.
12. 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.
13. Record compliance with this Service Instruction in the logbook.
14. Correct any problems before releasing the engine back into service.