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SERVICE INSTRUCTION

DATE: March 20, 2009

Service Instruction No. 1492D
(Supersedes Service Instruction No. 1492C
Engineering Aspects are
FAA DER Approved

SUBJECT: Piston Pin Plug Wear Inspection

MODELS AFFECTED: All Lycoming new or factory rebuilt or factory overhauled engines shipped from Lycoming after January 1, 1994, and all engines which have had a Lycoming Cylinder Kit installed after January 1, 1994, except O-235 models.

TIME OF COMPLIANCE: At next oil change/oil filter replacement, not to exceed 50 hours of engine operation (first 25 hours and next 25 hours for new, rebuilt, or newly overhauled engines) and at each 50 hours of engine operation thereafter.

Field reports indicate an increase in incidents of abnormally worn piston pin plugs in some units shipped after January 1, 1994. Evidence of such wear can be detected by use of an oil filter content inspection or spectrographic oil analysis.

Refer to the latest revision of Lycoming Service Bulletin No. 480 for oil and filter change intervals and procedures.

I. Oil Filter/Suction Screen Content Inspection:

NOTE

To insure that no external contaminants enter the oil filter/suction screen, use clean containers for collecting oil; and perform inspections on clean surfaces.

1. For engines employing a pressure screen system, remove the suction screen and check for metal particles.
2. Using approved method (e.g., for full flow, spin-on filters, use Champion Tool CT-470 or Airwolf Cutter AFC-470) open the filter.
3. Check the condition of the oil from the filter. Inspect for a high concentration of aluminum in the oil, indicated by a shining, metallic residue.
4. After draining oil, remove the suction screen from the oil sump and check for metal particles.
5. Remove the paper element from the filter.
6. Carefully unfold the paper element and examine the material trapped in the filter.
7. When performing the regular oil filter/suction screen inspection, check for premature or excessive wear of piston pin plugs, indicated by the presence of metal particles, shavings, or flakes.



General Aviation
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NOTE

Several samples taken at the regular oil change intervals must be analyzed to determine the normal characteristics of the engine. Also note that the first few samples on new, newly overhauled, or newly rebuilt engines may read high, as new parts are wearing in and are conforming to each other.

8. Evidence of metal contamination found in the oil filter element or suction screen requires further examination to determine the cause. Below is a list of recommended actions based on the appearance and approximate quantity of particles found in the oil filter/suction screen.

Continue performing steps a. through d. until there is no further evidence of metal contamination in the oil filter element or suction screen. If at any time the amount of metal contamination equals or exceeds what is stated in steps e. through j. remove engine from service.

- a. 1 to 9 small (1/16 inch diameter or less) pieces of magnetic or nonmagnetic metal – change oil filter and clean suction screen, drain oil, and refill. Place aircraft back in service and check oil filter or screen at next scheduled oil change/oil filter replacement.
- b. 10 to 20 small (1/16 inch diameter or less) pieces of shiny flake-like, nonmagnetic, or 10 or fewer short hair-like pieces of magnetic material – change oil filter and clean suction screen, drain oil, and refill. Place engine back in service and again check oil filter or suction screen after 25 hours of engine operation.
- c. 20 to 40 small pieces as in step b. – change oil filter and clean suction screen, drain oil, and refill. Place the aircraft back in service and check oil filter or suction screen after 10 hours of engine operation.
- d. As in step b., but larger amount, such as 45-60 small pieces – change oil filter and clean suction screen, drain oil, and refill. Run engine on ground for 20-30 minutes. Inspect oil filter suction screen. If clean, fly aircraft for 1 to 2 hours and again inspect oil filter/suction screen. If clean, inspect oil filter/suction screen after 10 hours of engine operation.

 NOTE

In items e. through j. below, the engine must be removed from service until the source of the metal is determined and corrective maintenance has been accomplished.

- e. Pieces of metal ranging in size of broken lead pencil point (1/16 inch diameter) or larger. Remove suction (sump) screen to check for pieces of metal that may have fallen into the sump. In any event, ground aircraft and conduct investigation. A mixture of magnetic and nonmagnetic material in this case often times means a valve or ring and piston failure. Removing bottom spark plugs usually reveals the offending cylinder.
- f. Nonmagnetic plating averaging approximately 1/16 inch in diameter; may have copperish tint. Quantity found – 1/4 teaspoonful or more; ground aircraft and investigate.
- g. Same as in step b. but may be slightly larger in size and minus copperish tint. On direct drive engines, propeller action may be impaired. Ground aircraft and investigate.
- h. Nonmagnetic metal brass or copperish color. Resembles coarse sand in consistency. Quantity of 1/4 teaspoonful or more – ground aircraft and investigate.
- i. Anytime metal is found in the amount of 1/2 teaspoonful or more, it is justification for engine removal. Ground aircraft and investigate.

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- j. If any single or several pieces of magnetic or nonmagnetic metal larger than previously mentioned in steps e. through i. Ground aircraft and investigate.

NOTE

If the origin of the metal contamination cannot be determined, a call may be made to the Lycoming Product Support Department. A good description (photographs, color and quantity, etc.) of the metal may result in placing its origin. When phoning Lycoming or when returning metal removed from engines, supply the complete engine model designation, serial number, history of engine, oil temperature, oil pressures, and any unusual behavior of the engine on the ground or during flight. Do not ship material to Lycoming without first calling the Product Support Department.

- 9. If examination of the oil filter or suction screen, per the above, indicates abnormal aluminum or iron content, contact a technical representative of the Lycoming Product Support Department at 1-800-258-3279.

NOTE

Warranty for the metal analysis is available for engines listed under Models Affected only if the engine from which the sample is taken is a new, rebuilt, or overhauled engine from the Lycoming factory.

II. Spectrographic Oil Analysis:

NOTE

Spectrographic oil analysis does not replace recommended maintenance practices, such as oil filter, pressure screen, suction screen content inspection, cylinder differential pressure compression checks, and boroscopic examination, however, Lycoming does encourage the use of spectrographic oil analysis at every oil change as a method of monitoring engine component wear rate. Refer to the latest edition of Lycoming Service Letter No. L171. Use the recommended procedures to insure that the oil sample is free of outside contaminants.

- 1. In accordance with the latest edition of Lycoming Service Letter No. L171, collect an oil sample and submit it for analysis by a qualified facility. Lycoming recommends using a Spectrographic oil analysis facility that specializes in aircraft engines, and also using the same facility for each analysis, due to the differences in laboratory testing standards.

NOTE

Typically, the first oil analysis of a new, rebuilt, or newly overhauled engine will indicate higher concentrations of metal. After an initial break-in period, metal content should decrease rapidly to a level that remains essentially constant.

- 2. If an oil analysis report indicates elevated levels of aluminum (above 30 parts per million for non-turbocharged engines; above 40 parts per million for turbocharged engines) or iron (above 100 parts per million for non-turbocharged engines; above 130 parts per million for turbocharged engines), contact a technical representative at the Lycoming Factory Product Support Department.
- 3. If in a continuing program of oil analysis, results show a trend toward an increase in aluminum or iron content, inspect contents of the oil filter and suction screen in accordance with the procedures in Part I, Oil Filter/Suction Screen Inspection.

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