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SERVICE INSTRUCTION

DATE: February 24, 2014

Service Instruction No. 1009AW
(Supersedes Service Instruction No. 1009AV)
Engineering Aspects are
FAA Approved

SUBJECT: Recommended Time Between Overhaul Periods

MODELS AFFECTED: All Lycoming Piston Aircraft Engines

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 identifies the established Time Between Overhaul (TBO) for Lycoming piston aircraft engines that have **genuine Lycoming parts** only. The TBOs, herein, do not apply to Lycoming engine models that contain parts other than those supplied by Lycoming Engines.

The information in this revision of Service Instruction 1009 is approved as an Alternative Means of Compliance (AMOC) for compliance with AD-2012-19-01, paragraphs (f)(1)(i) and (f)(2)(i).

The TBOs take into account service experience, variations in operating conditions, and frequency of operation. **However, because of variations in the manner in which engines are operated and maintained, Lycoming Engines cannot give assurance that any individual operator will achieve the TBOs identified herein.**

Continuous service assumes that the aircraft will not be out of service for more than 30 consecutive days. If the aircraft is to be out of service for more than 30 consecutive days, refer to the latest revision of Service Letter L180.

Engine deterioration in the form of corrosion (rust) and the drying out and hardening of composition materials such as gaskets, seals, flexible hoses and fuel pump diaphragms can occur if an engine is out of service for an extended period of time. Due to the loss of a protective oil film after an extended period of inactivity, abnormal wear on soft metal bearing surfaces can occur during engine start. Therefore, all engines that do not accumulate the hourly period of TBO specified in this publication are recommended to be overhauled in the twelfth year.

Table 1 identifies the TBOs for Lycoming engine models used in fixed wing aircraft. Table 2 contains the TBOs for Lycoming engine models used on rotary wing aircraft.

NOTE

The recommended TBOs identified in Tables 1 and 2 do not apply to engines used for crop dusting or other aircraft used for chemical application. The TBO for engines in these applications is a maximum of 1500 hours, or at recommended TBO, whichever is lower.

Engine accessories and propellers could require overhaul prior to engine overhaul. Complete the overhaul of these components in accordance with the accessory manufacturer's recommendation.

Reliability and average service life cannot be predicted when an engine has undergone any modification not approved by Lycoming Engines. The TBOs shown in Tables 1 and 2 are recommendations for engines as manufactured, without considering any modifications that could alter the life of the engine. Refer to notes shown after Tables 1 and 2 and identified by number in Tables 1 and 2 for additional specific details.

Table 1
Fixed Wing Aircraft
Recommended Time Between Overhaul Periods

Engine Models	See Note	Hours
O-235 Series (except -F, -G, -J)	12	2400
O-235-F, -G, -J	13	2000
O-290-D	--------	2000
O-290-D2	--------	1500
O-320 Series (except O-320-H)	1,10,11	2000
O-320-H	11	2000
IO-320-A, -E	1,10,11	2000
IO-320-B, -D, -F	4,6,10,11	2000
IO-320-C	2,4,10,11	1800
AIO-320 (160 HP)	6	1600
AEIO-320 Series	6	1600
O-340 Series	1	2000
O-360 Series (except O-360-E, -J2A)	1,4,10,11	2000
O-360-E	4,11	2000
IO-360-L2A	11	2000
IO-360-A, -C, -D, -J (200 HP)	4,5,6,10,11	2000
IO-360-B, -E, -F, -M (180 HP)	1,4,10,11	2000
TO-360-C,-F; TIO-360-C	3,11	1800
TO-360-E (180 HP)	3,4,11	1800
AIO-360 (200 HP)	6	1400
TIO-360-A Series	3,11	1200
AEIO-360 Series (180 HP)	6	1600
AEIO-360 Series (200 HP)	6	1400
IO-390-A	11	2000
AEIO-390-A	6	1400
O-435; GO-435	--------	1200
GO, GSO-480; IGSO-480	1	1400
O-540-A, -B, -E4A5	1,10	2000
O-540-E4B5, -E4C5	1,11	2000
O-540-G, -H, -J	10,11	2000

Table 1 (Cont.)
Fixed Wing Aircraft
Recommended Time Between Overhaul Periods

Engine Models	See Note	Hours
O-540-L3C5D	2,11	2000
IO-540-A, -B (290 HP)	1,10,11	1400
IO-540-AG1A5	--------	1800
IO-540-C	1,10, 11	2000
IO-540-D	1,10	2000
IO-540-E, -G, -P	1,10,11	1600
IO-540-S, -AA	2,10	1800
IO-540-J, -R	2,10	1800
IO-540-J4A5	10	2000
IO-540-AB1A5, -AC1A5, -AF1A5	11	2000
IO-540-K, -L, -M, -N, -T, -V, -W	10,11	2000
AEIO-540 Series	6	1400
IGO & IGSO-540 Series	--------	1200
TIO-540-V, -W, -AE	3,4,11	2000
TIO-540-C, -AA, -AB, -AF, -AG, -AH, -AJ, -AK	3,4,7,11	2000
TIO-540-A, -F, -J, -N, -R, -S, -U	3,4,11,14	1800
TIO-541-A (320 HP)	3	1300
TIO-541-E (380 HP)	3,9	1600
TIGO-541 (425 HP)	3	1200
IO-580-B1A	11	2000
AEIO-580-B1A	6	1400
IO-720 Series	11	1800

Table 2
Rotary Wing Aircraft
Recommended Time Between Overhaul Periods

Engine Models	See Note	Hours
O-320-A2C, -B2C	11	2000
O-320-B2C (Robinson Helicopter only)	15	2200
HO-360-C1A	11	2000
O-360-C2B,-C2D; HO-360 (except –C1A); HIO-360-B	--------	1500
O-360-J2A	11	2000
O-360-J2A (Robinson Helicopter only)	15	2200
HIO-360-A, -C, -D, -E, -F Series	--------	1500
HIO-360-G1A	11	2000
VO-360-A Series	--------	600
VO-360-B; IVO-360	--------	1000
VO-435-A Series	--------	1200
VO-435-B Series	--------	1200
TVO-435 Series	3	1000
O-540-F1B5	11	2000

Table 2 (Cont.)
Rotary Wing Aircraft
Recommended Time Between Overhaul Periods

Engine Models	See Note	Hours
O-540-F1B5 (Robinson Helicopter only)	15	2200
IO-540-AE1A5	11	2000
IO-540-AE1A5 (Robinson Helicopter only)	15	2200
VO-540 Series	8	1200
IVO-540 Series	--------	600
TVO, TIVO-540 Series	3,8	1200

NOTES

1. Only engines built with 1/2 in. (12.7 mm) dia. exhaust valve stems. Engines of this series with 7/16 in. (11.1 mm) dia. exhaust valves must not exceed 1200 hours between overhauls regardless of the type of operation. New and rebuilt engines built with 1/2 in. (12.7 mm) dia. exhaust valve stems are identified, respectively, by serial numbers and date in the latest revision of Service Instruction No. 1136.
2. These engines are designed to incorporate exhaust turbocharging.
3. Turbochargers could require removal, prior to engine overhaul, for carbon removal and repair.
4. Engines with reverse rotation have same overhaul times as corresponding normal rotation engines.
5. 1200 HOURS: Engines that do not have large main bearing dowels must not be operated more than 1200 hours between overhauls.

   1400 HOURS: Engines that have large main bearing dowels can be operated to 1400 hours between overhauls. These include engines with serial numbers L-7100-51A and up, and L-101-67A and up; engines which are in compliance with the latest revision of Service Bulletin No. 326; and remanufactured engines shipped after January 26, 1970.

   2000 HOURS: Engines that have large main bearing dowels and redesigned camshafts can be operated to 2000 hours between overhauls. These include engines with serial numbers L-9762-51A and up; IO-360-C1E6 engines with serial numbers L-9723-51A and up; LIO-360-C1E6 engines with serial numbers L-524-67A and up; engines that are in compliance with the latest revision of Service Bulletin No. 326 and Service Instruction No. 1263. Rebuilt engines shipped after October 1, 1972, can be operated to 2000 hours between overhauls except those with serial numbers L-2349-51A and L-7852-51A which do not have the redesigned camshaft and must not exceed 1400 hours of operating time between overhauls.
6. The reliability and service life of engines can be detrimentally affected if they are repeatedly operated at alternating high and low power applications which cause extreme changes in cylinder temperatures. Flight maneuvers which cause engine overspeed also contribute to abnormal wear characteristics that tend to shorten engine life. These factors must be considered to establish TBO of aerobatic engines; therefore it is the responsibility of the operator to determine the percentage of time the engine is used for aerobatics and establish his own TBO. The maximum recommended is the time specified in this instruction.
7. TIO-540-C Series engines with serial numbers L-1754-61 and up, TIO-540-C Series engines that were rebuilt or overhauled at Lycoming Engines, Williamsport, PA after March 1, 1971, and TIO-540-C series engines that have been modified to incorporate large main bearing dowels as described

in the latest revision of Service Instruction No. 1225 can be operated to 2000 hours. Engines that do not incorporate this modification must not exceed 1500 hours between overhauls.

8. VO, TVO and TIVO-540 engines built with P/N 77450 connecting rods as described in the latest revision of Service Bulletin No. 371 can be continued in service to 1200 hours. Engines that do not incorporate this new connecting rod are restricted to 1000 hours for VO-540 models and 900 hours for TVO and TIVO-540. See the latest revision of Service Bulletin No. 371 for improved connecting rod assembly.
9. TIO-541-E series engines with serial numbers L-804-59 and up, rebuilt engines shipped after March 1, 1976, and all engines that incorporate the improved crankcases and cylinder assemblies described in the latest revision to Service Bulletin Nos. 334 and 353 can be operated for 1600 hours before overhaul. Engines not in compliance with these requirements are limited to 1200 hours recommended time between overhaul.
10. Some engines in the field have been altered to incorporate an inverted oil system in order to perform aerobatic maneuvers. Whenever this modification is done to an engine, the TBO of the engine must be determined in the same manner listed for AEIO engines of the same model series.
11. If an engine is being used in "frequent" type service and accumulates 40 hours or more per month, and has been so operated consistently since being placed in service, add 200 hours to TBO time.
12. To qualify for the 2400 hour TBO, high-compression, O-235's must have the increased strength pistons (P/N LW-18729). See the latest revision of Service Letter No. L213.
13. The high-compression O-235-F, -G and -J series do not have the increased-strength pistons (P/N LW-18729); therefore, they do not qualify for the 2400 hour TBO.
14. TIO-540-A series engines with serial numbers L-1880-61 and up, TIO-540-A series engines that were rebuilt or overhauled at Lycoming Engines, Williamsport, PA after March 1, 1971, and TIO-540-A series engines that have been modified to incorporate large main bearing dowels as described in the latest revision of Service Instruction No. 1225 can be operated to 1800 hours. Engines that do not incorporate this modification must not exceed 1500 hours between overhauls.
15. Only engines built to specifications intended for and installed in Robinson Helicopter applications are approved for 2200 hour TBO. Note number 11 no longer applies to these engines.

U.S. Department
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**Federal Aviation
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Engine & Propeller Directorate

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FEB 24 2014

Ms. Marian Folk
Principal Consultant Engineer
Lycoming Engines
652 Oliver Street
Williamsport, PA 17701

Subject: Request for Alternate Method of Compliance (AMOC) to Airworthiness Directive (AD) 2012-19-01 (AMOC Log # 14-15)

Dear Ms. Folk,

The Federal Aviation Administration (FAA) has received your email dated February 14, 2012 requesting an AMOC to, paragraph (f)(1)(i) and (f)(2)(i) of AD 2012-19-01 which states: "The time of the next engine overhaul as specified in Lycoming Service Instruction No. 1009AU, dated November 18, 2009, or …"

Lycoming is requesting a global AMOC to allow operators to use the time periods specified in Lycoming SI 1009AW to define the periods of the next overhaul as this change does not affect the intent of the AD. The 200 hour extension of the overhaul time for the Robinson Helicopter models, O-320-B2C, O-360-J2A, O-540-F1B5, and IO-540-AE1A5, already existed in Note 11 for frequent use operators. Lycoming performed an analysis of measurements of the parts from engines with operating times from 1850 and 2200 hours looking for trends associated with the change from 2000 to 2200 hours and did not find any issues. The data to substantiate these measurements and conclusions are in Lycoming Reports No. 3905, dated November 8, 2013, and Report No. 3909A, dated February 13, 2014. The 12 year calendar time currently in SI 1009 has not changed.

The changes to SI 1009 AW for this change include :
- In Table 2, added lines for, "Robinson Helicopter only" models and new overhaul time.
- Added Note 15 which applies to, "Robinson Helicopter only" models.

The New York Aircraft Certification Office approves your Global AMOC proposal to paragraph (f)(1)(i) and (f)(2)(i) of AD 2012-19-01 which states: "The time of the next engine overhaul as specified in Lycoming Service Instruction No. 1009AU,

dated November 18, 2009, or …" to replace, SI 1009AU with SI 1009AW, titled, "Recommended Time Between Overhaul Periods.

In accordance with FAA Order 8110.103A, the following conditions apply:

1. All provisions of 2012-19-01 that have not been specifically referenced above remain fully applicable and must be complied with accordingly.

2. This approval is transferable with engine(s) to other operators.

3. Before using this AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

4. The NYACO will revoke this AMOC if the NYACO later determines that this AMOC does not provide an acceptable level of safety.

Should you have any questions, please contact this office or Norman Perenson at telephone number 516-228-7337, fax 516-794-5531, or email at norman.perenson@faa.gov.

Sincerely,

James E. Delisio

for: Gaetano Sciortino
Manager, New York
Aircraft Certification Office

cc: James Delisio, ANE-171 (PDF Copy)

ANE-173:N.Perenson:(516)228-7337:02/21/14
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