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SERVICE INSTRUCTION

DATE: June 15, 2017

Service Instruction No. 1009BA
(Supersedes Service Instruction No. 1009AZ)
Engineering Aspects are
FAA Approved

SUBJECT: Time Between Overhaul (TBO) Schedules

MODELS AFFECTED: Lycoming Engine Models Defined Herein

REASON FOR REVISION: Clarified TBO requirements and recommendations. Updated Tables 1 and 2; revised NOTE 9; revised NOTE 15 to permit an additional 200-hour extension to TBO for specific Lycoming New, Rebuilt, and Factory Overhauled engine models; added NOTE 16

NOTICE: 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 Calendar Year and Operating Hour-based Time Between Overhaul (TBO) for certified Lycoming engine models operated and maintained in compliance with all applicable Lycoming Technical Publications and FAA Airworthiness Directives.

The TBOs stated in this Service Instruction do not apply to engines that:

- a. Do not conform to the original engine model type certificate configuration;
- b. Have been assembled, repaired, or overhauled with FAA-PMA parts, where the FAA-PMA parts have not been approved for use by Lycoming (contact Lycoming for information regarding FAA-PMA parts approved for use by Lycoming);
- c. Have been maintained or overhauled using methods other than Lycoming approved procedures; or
- d. Have been operated outside Lycoming's published specifications.

⚠ CAUTION: REPAIR OR MODIFICATION OF ENGINES USING PARTS OR PROCEDURES NOT APPROVED BY LYCOMING CAN DAMAGE OR AFFECT THE DURABILITY, SAFETY, AND RELIABILITY OF THE ENGINE. AS A RESULT, SERVICE LIFE CANNOT BE PREDICTED FOR ENGINES THAT HAVE UNDERGONE UNAPPROVED REPAIR OR MODIFICATION.

Engine accessories and propellers can require overhaul prior to engine overhaul. TBO extensions authorized by this Service Instruction do not alter any engine accessory or propeller manufacturer's recommended overhaul schedule. Overhaul accessories and propellers in accordance with the appropriate manufacturer's recommendation.

The information in this revision of Service Instruction No. SI-1009 is approved by the FAA as an Alternative Method of Compliance (AMOC) for AD-2012-19-01, paragraphs (f)(1)(i) and (f)(2)(i).

This Service Instruction is based on the engine being used in continuous operation. If it is known that an engine is to remain inactive for 30 or more days, refer to the latest revision of Service Letter L180.



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CALENDAR YEAR TBO

All engine models are to be overhauled within twelve (12) calendar years of the date they first entered service or of last overhaul. This calendar year TBO is to mitigate engine deterioration that occurs with age, including corrosion of metallic components and degradation of non-metallic components such as gaskets, seals, flexible hoses and fuel pump diaphragms.

⚠ CAUTION: CALENDAR YEAR TBO IS BASED ON ACCELERATED TESTING AND OVERALL FLEET SERVICE DATA. LOCAL CLIMATE CONDITIONS, STORAGE CONDITIONS, FREQUENT EXTENDED PERIODS OF INACTIVITY, PRESERVATION TECHNIQUES USED DURING INACTIVE PERIODS, AND FREQUENCY OF OIL CHANGES CAN AFFECT CORROSION OF METALS AND DEGRADATION OF NON-METALS.

For FAA Part 91 or EASA Part NCO (non-commercial) operations, the twelve (12) calendar year TBO can be exceeded only if a maintenance person with an Inspection Authorization (or international equivalent) has thoroughly examined the engine for corrosion and degradation in accordance with 14 CFR 43 Appendix D (or international equivalent) and has determined that the engine remains in an airworthy condition. This inspection is to be repeated annually or as necessary to ensure continued airworthiness. The twelve (12) calendar year TBO must not be exceeded if the engine is affected by AD 2012-19-09 and not in compliance with AD 2012-19-09. Lycoming recommends that operators do not exceed the TBO for fuel controls.

⚠ WARNING: OPERATION OF AN ENGINE IN A NON-AIRWORTHY CONDITION COULD RESULT IN LOSS OF LIFE, SERIOUS INJURY, AND DAMAGE TO PROPERTY. ENGINES ARE NOT TO BE OPERATED BEYOND 12 YEARS UNLESS CERTIFIED AS AIRWORTHY BY APPROPRIATE MAINTENANCE PERSONNEL. ENGINES THAT FAIL TO OPERATE WITHIN LYCOMING'S PUBLISHED OPERATING SPECIFICATIONS OR THAT SHOW ANY EVIDENCE OF CORROSION, WEAR, DAMAGE, OR OTHER CONDITION AFFECTING AIRWORTHINESS MUST BE IMMEDIATELY REMOVED FROM SERVICE AND OVERHAULED PER LYCOMING TECHNICAL PUBLICATIONS.

OPERATING HOUR TBO

Operating Hour TBOs for fixed wing aircraft are in Table 1 and for rotary wing aircraft are in Table 2. These TBOs are to mitigate engine deterioration that occurs during normal operation such as wear and high cycle fatigue of metallic components.

⚠ CAUTION: OPERATING HOUR TBOs ARE BASED ON ACCELERATED TESTING AND OVERALL FLEET SERVICE DATA. BECAUSE OF VARIATIONS IN THE MANNER IN WHICH ENGINES ARE OPERATED AND MAINTAINED, LYCOMING CANNOT GIVE ASSURANCE THAT ANY INDIVIDUAL OPERATOR WILL ACHIEVE THE OPERATING HOUR TBOs IDENTIFIED HEREIN.

NOTICE: The TBOs for engines used in crop dusting or other chemical application is a maximum of 1500 hours, or the time referenced in Tables 1 and 2, whichever is lower.

Tables 1 and 2 identified notes that are to be referenced for specific details about overhaul intervals. Those notes are contained at the end of this Service Instruction.

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Table 1
Fixed Wing Aircraft
Operating Hour Time Between Overhaul Periods

Engine Models/Series	See Note	Hours
O-235 (except -F, -G, -J)	12	2400
O-235-F, -G, -J	13	2000
O-290-D	-----	2000
O-290-D2	-----	1500
O-320 (except O-320-H)	1,10,11,15	2000
O-320-H	11	2000
IO-320-A, -E	1,10,11,15	2000
IO-320-B, -D, -F	4,6,10,11,15	2000
IO-320-C	2,4,10,11	1800
AIO-320 (160 HP)	6	1600
AEIO-320	6	1600
O-340	1	2000
O-360 (except O-360-E)	1,4,10,11,15	2000
O-360-E	4,11	2000
IO-360-L2A	11,15	2000
IO-360-A, -C, -D, -J (200 HP)	4,5,6,10,11,15	2000
IO-360-B, -E, -F, -M, -N (180 HP)	1,4,10,11,15	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	3,11	1200
AEIO-360 (180 HP)	6	1600
AEIO-360 (200 HP)	6	1400
IO-390-A, -C	11,15	2000
AEIO-390-A	6	1400
O-435; GO-435	-----	1200
GO, GSO-480; IGSO-480	1	1400
O-540-A, -B, -E4A5	1,10,15	2000
O-540-E4B5, -E4C5	1,11,15	2000
O-540-G, -H, -J	10,11,15	2000
O-540-L3C5D	2,11	2000
IO-540-A, -B (290 HP)	1,10,11	1400
IO-540-AG1A5	-----	1800
IO-540-C	1,10,11,15	2000
IO-540-D	1,10,15	2000

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**Table 1 (Cont.)
Fixed Wing Aircraft
| Operating Hour Time Between Overhaul Periods**

Engine Models/Series	See Note	Hours
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	11,15	2000
IO-540-K, -L, -M, -N, -T, -V, -W	10,11,15	2000
AEIO-540	6	1400
IGO & IGSO-540	-----	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	11,15	2000
AEIO-580-B1A	6	1400
IO-720	11	1800

**Table 2
Rotary Wing Aircraft
| Operating Hour Time Between Overhaul Periods**

Engine Models/Series	See Note	Hours
O-320-A2C, -B2C	11,15	2000
HO-360-C1A	11	2000
O-360-C2B, -C2D; HO-360 (except -C1A); HIO-360-B	-----	1500
O-360-J2A	11,15	2000
HIO-360-A, -C, -D, -E, -F	-----	1500
HIO-360-G1A	11	2000
VO-360-A	-----	600
VO-360-B; IVO-360	-----	1000
VO-435-A	-----	1200
VO-435-B	-----	1200
TVO-435	3	1000
O-540-F1B5	11,15	2000
IO-540-AE1A5	11,15	2000
VO-540	8	1200
IVO-540	-----	600
TVO, TIVO-540	3,8	1200

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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 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 a 1200-hour TBO.

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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. (Engines affected by AD 2012-19-01 and not in compliance with AD-2012-19-01 are not eligible for this TBO extension.)
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. A 200-hour extension to the listed TBO can be applied to Lycoming Factory New, Lycoming Factory Rebuilt, and Lycoming Factory Overhauled engine models. Engine repairs or field overhauls that are performed by any entity other than the Lycoming Factory in Williamsport PA must meet all of the following requirements to be eligible for this 200-hour TBO extension:
 - a. Be performed using ONLY Lycoming genuine parts or FAA-PMA parts approved by Lycoming
 - b. Be performed using ONLY Lycoming approved procedures
 - c. Block 12 of FAA form 8130-3 must indicate the repair or overhaul was performed using ONLY Lycoming approved procedures and Lycoming genuine parts or FAA-PMA parts approved by Lycoming

A repair or overhaul performed using any FAA approved local shop procedures or using FAA-PMA parts not approved by Lycoming is not eligible for this 200-hour TBO. (Engines affected by AD 2012-19-01 and not in compliance with AD-2012-19-01 are not eligible for this TBO extension.)
16. When NOTE 15 is referenced with NOTE 11 for engine models in Tables 1 and 2, and the conditions of both NOTES are met, the sum of the extended TBO hours in both NOTES 11 and 15 can be added to the required TBO, thus extending the TBO a total of 400 hours. (Engines affected by AD 2012-19-01 and not in compliance with AD-2012-19-01 are not eligible for this TBO extension.)

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U.S. Department
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**Federal Aviation
Administration**

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JUN 15 2017

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 # 17-46)

References: 1. FAA AD 2012-19-01
2. Lycoming Service Instruction (SI) No. 1009BA, Time Between Overhaul (TBO) Schedules (attached)
3. Email from R. Reinhardt to M. Folk, dated 6/5/2017, approving 1009BA

Dear Ms. Folk,

The Federal Aviation Administration (FAA) has received your letter dated June 5, 2017 requesting an AMOC to, paragraph(s) (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 1009BA to define the time of the next overhaul. The new 200 hour extension introduced by SI 1009BA is only applicable to engines with "15" in the "See Note" column, and Note 15 specifies that engines affected by, and not in compliance with, AD 2012-19-01 are not eligible for the 200 hour extension. All the notes addressing TBO extension, Notes 11, 15, and 16, specify that any engine affected by, and not in compliance with AD 2012-19-01 are not eligible for the TBO extension. The 12 year calendar time limit currently in SI 1009 has not changed.

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 1009BA, titled, "Recommended Time Between Overhaul Periods." Approval of SI 1009BA as an AMOC to AD 2012-19-01 will provide an equivalent level of safety.

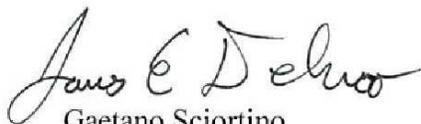
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In accordance with FAA Order 8110.103B, the following conditions apply:

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,



Gaetano Sciortino
 for: Manager, New York
 Aircraft Certification Office

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

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