



OFFICE OF THE NATIONAL COMMANDER
NATIONAL HEADQUARTERS
CIVIL AIR PATROL
UNITED STATES AIR FORCE AUXILIARY
MAXWELL AIR FORCE BASE, ALABAMA 36112-5937

21 April 2020

MEMORANDUM FOR ALL REGION AND WING COMMANDERS

FROM: CAP/CC

SUBJECT: Aircraft Engine Preservation Flights during COVID-19 Limited Operations

1. During this period of reduced flight activity, we need to consider how this inactivity will affect our aircraft. Textron Lycoming provides guidance for aircraft owners whose aircraft are only flown occasionally, and the majority of our fleet has Lycoming engines. Engines that sit idle are subject to damage, the result of condensation from moist air combining with combustion products that attack cylinder walls, bearing surfaces and other engine components.
2. In their Service Letter No. L180B dated November 13, 2001, Textron Lycoming states engine temperature and length of operating time are crucial to controlling rust and corrosion in aircraft engines. The desired flight time for air cooled engines is at least one continuous hour at oil temperatures of 165°F to 200°F at intervals not to exceed 30 days, depending on location and storage conditions. This one-hour flight does not include taxi, take-off and landing time.
3. In order to maintain airworthiness and mission readiness of our fleet, CAP/LG is recommending that all aircraft that have not been flown in the past 21 days be flown in accordance with the guidelines regarding time and oil temperature contained in Textron Lycoming's Service Letter.
4. In order to support the above and also maintain CAP's capability to support missions, we are authorizing one A12 proficiency sortie of 1.5 to 2.0 hours in duration to be flown per aircraft each week until we return to normal operations. These flights will have only one qualified mission pilot (MP) on board with no other passengers or crew, and MPs are required to disinfect the aircraft before and after each flight (see procedures posted on the [CAP COVID-19 Information Center](#)). Priority should be placed on flying aircraft that have not been supporting other missions during this period and working to keep as many aircraft as possible flyable. Operations staff should also work to be sure opportunities to fly are shared amongst qualified MPs near each aircraft, and priority placed on keeping key personnel qualified like Check Pilots and Mission Check Pilots who will be critical when returning to normal operations.
5. Critical maintenance sorties, real world mission support and other necessary flying as previously outlined remains authorized.

6. Aircraft maintenance concerns should be directed to CAP/LG, Gary Schneider, at gschneider@capnhq.gov and operations issues including funds needed for A12 sorties should be addressed to CAP/DO, John Desmarais at jdesmarais@capnhq.gov.



MARK E. SMITH
Major General, CAP
National Commander

Attachment:

Lycoming Service Letter No. L180B

cc:

CAP/CV/XO/CCC/COO/DO/GC/GVR/LG/PA/SE

CAP-USAF/CC/CV/DO/DT/JA/LG/SE

All CAP Region and Wing CV/CS/DC/DO/DOC/DOH/DOS/DOV/LG/SE

SERVICE LETTER

Service Letter No. L180B
(Supersedes Service Letter No. L180A)
November 13, 2001

TO: All Owners and Operators of Textron Lycoming Aircraft Engines

SUBJECT: Engine Preservation for Active and Stored Aircraft

Engines in aircraft that are flown only occasionally may not achieve normal service life because of corrosion. This occurs when moisture from the air and products of combustion combine to attack cylinder walls and bearing surfaces during periods when the aircraft is not used. The procedures for combating this condition consist of coating the vulnerable surfaces with rust inhibitive compounds as herein described.

NOTE

Need for preservation must be evaluated by the owner or operator of the aircraft based on environmental conditions and frequency of aircraft activity. The time periods given are recommendations based on normal conditions.

Our experience has shown that in regions of high humidity, active corrosion can be found on cylinder walls of new engines inoperative for periods as brief as two days. In engines that have accumulated 50 hours or more time in service in a short period, the cylinder walls will have acquired a varnish that tends to protect them from corrosive action; such engines under favorable atmospheric conditions can remain inactive for several weeks without evidence of damage by corrosion.

Aircraft operated close to oceans, lakes, rivers and in humid regions have a greater need for engine preservation than engines operated in arid regions.

ACTIVE ENGINES:

Engine temperature and length of operating time are very important in controlling rust and corrosion. The desired flight time for air cooled engines is at least one continuous hour at oil temperatures of 165°F to 200°F at intervals not to exceed 30 days, depending on location and storage conditions. This one hour does not include taxi, take-off and landing time. If recommended oil temperatures are not obtainable, contact aircraft manufacturer for availability of oil cooler winterization plates.

The aircraft temperature gages should be checked to make sure that they are accurate.

The cooling air baffles need to be in good condition and fitted properly to assure proper cooling air flow.

The oil cooler system needs to be of the proper size for the engine and airframe installation. Oil coolers that are sized incorrectly can cause over-heating or below minimum temperatures. Low temperatures are just as harmful as high temperatures due to build-up of water and acids.

Oil changes are very important in minimizing rust and corrosion. Reference latest revision of Textron Lycoming Service Bulletin No. 480 for recommended oil/filter change intervals and procedures.

Pulling engines through by hand when the aircraft is not run or flown for a week or so is not recommended. Pulling the engine through by hand prior to start or to minimize rust and corrosion does more harm than good. The cylinder walls, piston, rings, cam and cam follower only receive splash and vapor lubrication. When the prop is pulled through by hand, the rings wipe oil from cylinder walls. The cam load created by the valve train wipes oil off the cam and followers. After two or three times of pulling the engine through by hand without engine starts, the cylinders, cam and followers are left without a proper oil film. Starting engines without proper lubrication can cause scuffing and scoring of parts resulting in excessive wear.

INACTIVE ENGINES:

If it is known that an aircraft is to remain inactive for 30 or more days, the following procedure should be applied to the engine, especially if the aircraft is located near salt water or similar humid environment.

1. Install a preservative by one of the following methods:
 - a. Drain the lubricating oil from the sump or system and replace with a preservative oil mixture. This preservation mixture consists of one part by volume MIL-C-6529C Type I concentrated preservative compound added to three parts by volume of MIL-L-6082C (SAE J1966), Grade 1100, mineral aircraft engine oil or oil conforming to MIL-C-6529C Type II. Follow carefully the manufacturer's instructions before use.
 - b. An alternative method is the use of Cortec VC1-326 preservative concentrate added to the original oil at a ratio of 1 part VC1-326 to 10 parts of oil.
2. Operate the engine until normal temperatures are obtained.

Do not stop engine until oil temperature has attained 180°F (82°C). If weather conditions are below freezing, oil temperature should reach at least 165°F (73°C) before shut down.

3. Remove sufficient cowling to gain access to the top spark plugs and remove them.
4. Through the spark plug hole, spray the interior of each cylinder with approximately two ounces of the preservative oil mixture using an airless spray gun (Spraying Systems Co., Gunjet Model 24A-8395 or equivalent). In the event an airless spray gun is not available, a moisture trap may be installed in the air line of a conventional spray gun.
5. Reinstall spark plugs and do not turn crankshaft after cylinders have been sprayed.

NOTE

Oils of the type mentioned are to be used in Lycoming aircraft engines for preservation only and not for lubrication. See the latest revision of Textron Lycoming Service Instruction No. 1014 for recommended lubricating oil.

6. If the aircraft is stored in a region of high humidity, or near a sea coast, it is better to use dehydrator plugs instead of merely replacing the spark plugs as directed in the preceding step. Cylinder dehydrator plugs, MS-27215-2 or equivalent may be used.
7. Preferably before the engine has cooled, install small bags of desiccant in exhaust and intake ports and seal with moisture impervious material and pressure sensitive tape. Any other opening from the engine to the atmosphere, such as the breather, and any pad from which an accessory is removed, should likewise be sealed.

Desiccant may be obtained through a Textron Lycoming distributor using the following part numbers:

Part No. 40249	= 1/2 lb. Desiccant
Part No. 40249-1	= 1 lb. Desiccant
Part No. 40249-2	= 1/8 lb. Desiccant
Part No. 40249-3	= 1/4 lb. Desiccant

8. Firmly attach red cloth streamers to any desiccant bags installed in the intake and exhaust passages to insure material is removed when the engine is made ready for flight. Streamers should be visible from outside the aircraft. Propeller should be tagged, "Engine preserved – do not turn propeller".
9. At 15-day maximum intervals, a periodic check should be made of the cylinder dehydrator plugs and desiccant. When the color of the desiccant has turned from blue to pink the preservation procedure must be repeated.
10. To return the aircraft to service, remove seals, tape, and desiccant bags. Use a solvent to remove tape residue. Remove spark plugs or dehydrator plugs. With the magnetos off rotate the propeller by hand through sufficient rotation to remove excess preservative oil from the cylinders. Drain the remaining preservative from the engine through the sump.

WARNING

TO PREVENT SERIOUS BODILY INJURY OR DEATH, BEFORE MOVING THE PROPELLER TAKE ALL PRECAUTIONS TO PREVENT THE FIRING OF THE ENGINE. DISCONNECT SPARK PLUG LEADS; INSURE MAGNETOS ARE SWITCHED OFF AND P-LEADS ARE GROUNDED; INSURE THAT THE THROTTLE IS CLOSED AND THE MIXTURE IS IN "IDLE CUT-OFF". DO NOT STAND WITHIN THE ARC OF THE BLADE. EVEN WITHOUT SPARK, COMPRESSION CAN CAUSE THE PROPELLER TO MOVE WITH SUFFICIENT FORCE TO CAUSE SERIOUS INJURY.

Install spark plugs and reconnect all parts in accordance with manufacturer's instructions. Service the engine with approved lubricating oil.

NOTE

Although the above procedures should prevent corrosion under favorable conditions, it is recommended that the engine be periodically inspected for evidence of corrosion.

The foregoing are general recommendations for proper engine care. Since local conditions may differ and Textron Lycoming has no control over the application of these recommendations, no warranty against corrosion is intended.

NOTE

1. Cortec Corp. - manufactures preservative oils
4119 White Bear Parkway
St. Paul, MN 55510
Phone: 612-429-1100
800-4-CPORTEC
Fax: 612-429-1122

2. Protect Air Mfgs. - MS27215-2 plugs
Fernandina Beach, FL 32034
Phone:
or 904-261-0601
Fax: