

Engine Record General Information

Manufacturer TEXTRON - LYCOMING Model O-360-A1A
Serial L-21563-36 A Type Certificate _____
This engine is currently installed in aircraft: CESNA model 177 N3268T
S/N 17700568 1967
Minimum Octane Fuel _____ Oil Grade Summer _____ Winter _____
Magnetto Time _____ Point Setting _____ Firing Order _____
Spark Plug Gap _____
Manufacturer's Recommended Overhaul at 2000 hours or 12 YEARS

Mena Aircraft Engines, Inc.
402 Aviation Lane

» Service Letter

Technical Aspects are FAA Approved

Number: L96-08 D

Replaces ServL 96-008C

Date: 07/15/2004

Subject: Millennium Cylinder On-Aircraft Break-In Procedure

Application: All engines with newly installed Millennium cylinders that are to be broken-in on the aircraft.

To achieve satisfactory ring seating and long cylinder life, after top overhaul or a major engine overhaul, break-in is critical. The aircraft can be a suitable test stand for running-in cylinders. All original equipment manufacturer's and Superior Air Parts service information should be followed for a successful break-in. The following are some general guidelines for break-in.

PRIOR TO START-UP:

- Engine should be filled, according to the operator's manual, with 100% mineral oil (specific grade depending on ambient temperature).
- Engine must be pre-oiled and oil pressure obtained prior to start-up. See appropriate service data for procedures.
- Engine baffles and seals must be in good condition and properly installed.
- Verify accuracy of instruments.

GROUND RUN:

- Flight propeller may be used if test club is not available.
- Head aircraft into the wind.
- Start engine, and observe oil pressure. Oil pressure should be indicated within 30 seconds – if not, shut down engine, and determine cause.
- Run engine just long enough to confirm everything is properly adjusted, secured and there are no fuel and/or oil leaks.
- Install cowling.
- Operate engine at 1000-RPM until oil has reached minimum operating temperature.
- Check magneto drop at normal RPM.
- If engine is equipped with a controllable pitch propeller, cycle only to a 100-RPM drop.
- Shut down engine and check for fuel and/or oil leaks and repair any discrepancies.
- At no time should cylinder head temperature be allowed to exceed original airframe equipment manufacturer recommended maximum cruise limit.

BREAK-IN FLIGHT OPERATION:

- Perform normal pre-flight and run-up in accordance with engine operator's manual (remember: only cycle prop to a 100 RPM drop if you have a controllable pitch propeller). Keep ground runs to a minimum.
- Conduct normal take-off at full power, full rich mixture, to a safe altitude.
- Maintain a shallow climb at full power. Use caution to avoid overheating the cylinders. Should overheating occur, reduce power and adjust mixture appropriately. Refer to Pilot's Operating Handbook for specific procedures and temperatures including leaning to a fuel flow meter or leaning without EGT or fuel flow meters.
- Monitor RPM, oil pressure, oil temperature & cylinder temperature.
- During the first hour of operation, maintain level flight at 75% power. Vary the power setting every 15 minutes during the second hour between 65-75%.
- Avoid long descents at cruise RPM and low manifold pressure (could cause ring flutter).
- After landing, check again for any fuel and/or oil leaks, or other discrepancies, and repair.
- Continue flying at 65-75% power with mixture adjusted to approximately 75°F rich of peak EGT on subsequent flights until rings have seated, oil consumption stabilizes, and cylinder head temperatures drop. This is a sign that the cylinders are broken in. Refer to Pilot's Operating Handbook for leaning with fuel a flow meter or leaning without fuel flow or EGT meters.
- After break-in, oil may be changed to ashless dispersant of the proper grade.
- At no time should cylinder head temperature be allowed to exceed original airframe equipment manufacturer recommended maximum cruise limit.

NOTE:

Verify that crankcase breather and vent lines are correctly installed and positioned. Excessive oil discharge through the breather can often be directly related to an improperly installed or restricted breather line.

CAUTION:

Break-in of an engine in frigid conditions can lead to cylinder glazing and failed break-in due to low oil temperature. It is recommended that oil temperature be maintained between 180° and 190° F.

Service Instruction #1

Models Affected: All Models after Overhaul

Warranty Requirement

Due to shrinkage of new gaskets and other variations caused by the heating and cooling of a newly overhauled engine, it is **ABSOLUTELY MANDATORY** that the engine be inspected at 15-18 hours of operation after major overhaul. Inspection must be done, all items checked off by a licensed mechanic, and one copy of this form returned to Mena Aircraft Engines, Inc. within five (5) days of said inspection. Any exception must be by written permission from Mena Aircraft Engines, Inc.

1. Change oil and filter and/or clean oil screen. _____

2. Check crankcase half bolts and cylinder base nuts for proper torque. Do not
Remove parts to check these torques unless there is a problem. _____

3. Check sump and accessories housing bolts and nuts for proper torque. _____

4. Check generator/alternator bolts and nuts for proper torque. _____

5. Check intake hose clamps for proper torque. _____

6. Tighten rocker box cover screws. Be careful not to over torque. _____

7. Check exhaust system; re-torque exhaust clamps and nuts according to
manufacturer's recommended torque values. _____

8. Check magneto timing, and check magneto hold down nuts for proper torque. _____

9. Visually inspect the complete engine for discrepancies. _____

Date: _____ Work Order No: **17I-2212** Authorized Sig: _____

License No. or CRS No: _____ Aircraft "N" No: _____ 3268T _____

Owner at time of Overhaul _____

Engine Make: _____ LYCOMING _____ Engine Model No: _____ O-360-A1A _____

Engine Serial No: _____ L-21563-36A _____ Engine Time Since Major Overhaul: _____

—15/18 Hour Inspection at the Expense of Owner—

Form No: M10

Hard Facts About Engine Break-In

Most people seem to operate on the philosophy that they can best get their money's worth from any mechanical device by treating it with great care. This is probably true, but in many cases it is necessary to interpret what great care really means. This is particularly applicable when considering the break-in of a modern, reciprocating aircraft engine.

Aircraft owners frequently ask about the proper procedures for run-in of a new or rebuilt engine so they can carefully complete the required steps. Many of these recommended break-in procedures also apply to engines which have been overhauled or had a cylinder replaced.

The first careful consideration for engine run-in is the oil to be used. The latest revision of Textron Lycoming Service Instruction 1014 should be consulted for this information. The basic rule which applies to most normally aspirated Lycoming piston engines is simple; use straight mineral oil of the proper viscosity for the first fifty hours or until oil consumption stabilizes. Then switch to ashless dispersant (AD) oil.

The exceptions to the basic rule above are the O-320-H and the O/LO-360-E series. These engines may be operated using either straight mineral oil or ashless dispersant oil, however, if the engine is delivered with ashless dispersant oil installed, it must remain on ashless dispersant oil. The Textron Lycoming oil additive P/N LW-16702 must be added to the O-320-H and O/LO-360-E engines at airframe installation, and every 50 hours thereafter or at every oil change. An FAA-approved lubricating oil that contains, in the proper amount, an oil additive equivalent to LW-16702 will meet the requirements for the additive as stated in Lycoming Service Instruction No. 1014M.

All Lycoming turbocharged engines must be broken in with ashless dispersant oil only.

When taking delivery of a new aircraft, there is another point which must be emphasized. Some aircraft manufacturers add approved preservative lubricating oil to protect new engines from rust and corrosion at the time the aircraft leaves the factory. This preservative oil must be removed by the end of the first 25 hours of operation.

Each new or rebuilt engine is given a production test run at the factory before the engine is delivered to an aircraft manufacturer or other customer. After installation in the aircraft, the engine is run again during the test flights. These test runs will insure that the engine is operating normally and will provide an opportunity to locate small oil leaks or other minor discrepancies. In addition, these test runs do the initial seating of the piston rings. The rest of the break-in is the responsibility of the pilot who flies the aircraft during the next 50 hours.

A new, rebuilt, or overhauled engine should receive the same start, warm-up, and preflight checks as any other engine. There are some aircraft owners and pilots who would prefer to use low power settings for cruise during the break-in period. This is not recommended. A good break-in requires that the piston rings expand sufficiently to seat with the cylinder walls during the engine break-in period. This seating of the ring with the cylinder wall will

only occur when pressures inside the cylinder are great enough to cause expansion of the piston rings. Pressures in the cylinder only become great enough for a good break-in when power settings above 65% are used.

Full power for takeoff and climb during the break-in period is not harmful; it is beneficial, although engine temperatures should be monitored closely to insure that overheating does not occur. Cruise power settings above 65%, and preferably in the 70% to 75% of rated power range should be used to achieve a good engine break-in.

It should be remembered that if the new or rebuilt engine is normally aspirated (nonturbocharged), it will be necessary to cruise at the lower altitudes to obtain the required cruise power levels. Density altitudes in excess of 8000 feet (5000 feet is recommended) will not allow the engine to develop sufficient cruise power for a good break-in.

For those who still think that running the engine hard during break-in falls into the category of cruel and unusual punishment, there is one more argument for high power settings during engine break-in. The use of low power settings does not expand the piston rings enough, and a film of oil is left on the cylinder walls. The high temperatures in the combustion chamber will oxidize this oil film so that it creates a condition commonly known as glazing of the cylinder walls. When this happens, the ring break-in process stops, and excessive oil consumption frequently occurs. The bad news is that extensive glazing can only be corrected by removing the cylinders and re honing the walls. This is expensive, and it is an expense that can be avoided by proper break in procedures.

To summarize, there are just a few items to remember about engine break-in: (1) If a preservative oil has been added by the aircraft manufacturer, drain it not later than the first 25 hours of operation; (2) Follow the engine manufacturers recommendation regarding the oil to be used for break-in and the period between changes; (3) Run the engine at high cruise power levels for best piston ring/cylinder wall mating; (4) Continue break in operation for 50 hours or until oil consumption stabilizes. These simple procedures should eliminate the possibility of cylinder wall glazing and should prepare the engine for a long and satisfactory service life.

Alterations
(Number of
entries.)

RECORDING
TACH
TIME

TODAY'S
FLIGHT

TOTAL
TIME IN
SERVICE

Description of Inspections, Tests, Repairs and Alterations

Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)

DATE: 04/12/19 TACH: 3324.7 TT: 10.2 SMON
DRAINED OIL AND REFILLED WITH
8 QUARTS OF AEROShell 100 / FILTER
COMPRESSION CHECK: CYL1 80 CYL2 80
CYL3 80 CYL4 80 CYL5 CYL6 CYL7
CYL8 CYL9 OVER 80

HUGH R HUNTON AP2665705JA

DATE: 04/12/19 TACH: 3329.7 TT: 10.2
I CERTIFY THAT THIS: ENGINE
HAS BEEN INSPECTED IAW A: ANNOVA
INSPECTION AND WAS DETERMINED
TO BE IN AIRWORTHY CONDITION.

HUGH

DATE: 04/27/20 TACH: 3348.9 TT: 29.0
DRAINED OIL AND REFILLED WITH
QUARTS OF
COMPRESSION CHECK: CYL1 80 CYL2 80
CYL3 80 CYL4 80 CYL5 CYL6 CYL7
CYL8 CYL9 OVER 80

DATE: 04/15/21 TACH: 3386.9 TT: 67.2
DRAINED OIL AND REFILLED WITH
7 QUARTS OF 5W-30 100
COMPRESSION CHECK: CYL1 80 CYL2 80
CYL3 80 CYL4 80 CYL5 80 CYL6 80 CYL7 80
CYL8 80 CYL9 80

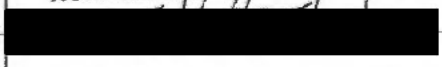
HUGH R HUNTON AP26657051A

DATE: 04/15/21 TACH: 3386.9 TT: 67.2
I CERTIFY THAT THIS: ENGINE
HAS BEEN INSPECTED IAW A: ANACELL
INSPECTION AND WAS DETERMINED
TO BE IN AIRWORTHY CONDITION.

HUGH R HUNTON

05/22/18	3314.5	2399.5	5N	"D" SIMON
				INSTALLED ENGINE IN CESSNA 177 N3268T
				N3268T S/N 1700568.
				R/R BAFFLE RUBBER SEALS.
				R/R HOSES TSO'S PRECISION FLOSE TECH
				R/R DUCT PIPES SVAT
				R/R HORN MOUNTS HT-4613-49
				R/R ENGINE MOUNT BOLTS AN-40A
				2 QTS AEROSHELL 100.

DATE: 05/22/18 TACH: 2399.5 TT: 2399.5
 I CERTIFY THAT THIS: ENGINE
 HAS BEEN INSPECTED BY AT: ANNUAL
 INSPECTION AND WAS DETERMINED
 TO BE IN AIRWORTHY CONDITION.

HUGH R HUNTON  


NEW PARTS

Major overhauled gasket and seal set, crankshaft oil seal, crank gear screw and lockplate, connecting rod bushings, connecting rod bearings M003, connecting rod bolts and nuts, front main bearings M003, intermediate and rear main bearings M003, crankcase thru-bolt dowels and o rings, oil pressure relief ball, oil pressure spring, adjustable oil pressure relief valve, internal crankcase slotted nuts, cylinder oil drain tubes(4), oil temperature vernatherm valve, piston pins p/n SL13444-1, SAP Millennium cylinder assemblies with valves, springs, pistons, and piston rings, valve roto-caps, rocker shafts w/ thrust buttons, silicone valve cover gaskets, intake flange bolts, valve cover screws, oil quick drain valve cylinder oil drain hoses and clamps, push rod shroud housings, induction tube hoses and clamps, tach drive shaft retaining ring, idler shaft bolts, camshaft, starter, fuel pump, crankcase thru-bolts, fuel pump drive plunger, ignition harness, spark plug p/n REM38E. supplied exhaust nuts and gaskets.

Engine Sign-Off: this engine overhauled test run in accordance with current and applicable FAA data and procedures and is approved for return to service. pertinent details of the overhaul are on file at this repair station #S9QR340N, under work order #171-2212 by Mena Aircraft Engines, Inc. of Mena, AR [REDACTED] date February 01, 2018. See back of this engine log book for listing of Airworthiness