

service bulletin

M89-7R1
Supersedes M89-7

Technical Portions Are
FAA Approved

4 August 1989

SUBJECT: **ENGINE OPERATION AFTER CYLINDER REPLACEMENT AND/OR MAJOR OVERHAUL**

MODELS

AFFECTED: All Models (Steel, Nitrided or Chrome Cylinders)

Proper operation of the engine following cylinder replacement or major overhaul is extremely important. The following procedures should be followed to insure that adequate lubrication is being provided to newly installed components and that the piston ring seating will occur as soon as possible.

I. Operation After Major Overhaul Utilizing an Engine Test Cell

A. Servicing and Pre-starting Procedures

1. Service the lubricating system with mineral oil of the appropriate grade depending on ambient temperature.

NOTE...Corrosion preventive mineral oil MIL-C-6529 Type II can be used but must not be used after the first 25 hours, or six months, whichever occurs first as this oil can cause coking with extended use.

2. Rotate the propeller by hand through several cycles with the spark plugs removed.
3. Pre-oil the lubrication system using an external pre-oiling pressure system.
4. Install the spark plugs and ignition harness.

B. Test Cell Operational Procedures

1. Consult the applicable TCM Overhaul Manual and follow the recommended test cell operational procedures listed.

II. Operation After Major Overhaul Utilizing The Aircraft in Lieu of an Engine Test Cell

A. The aircraft can be considered a suitable test stand for running-in overhauled engines contingent on the following conditions:

1. Install engine cowling.

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2. Each cylinder should be equipped with a temperature sensing device to monitor the head temperature. If the aircraft cylinder head temperature gauge monitors one cylinder, the following precaution must be adhered to:

During ground runs do not permit monitored head temperatures to exceed 400 degrees f or oil temperature to exceed 200 degrees f.

3. The flight propeller may be used contingent on careful observation of cylinder temperatures. Head the aircraft into the wind for this test.
4. Calibration of the aircraft engine instruments must be performed.

- B. Prepare and test the engine per the procedures outlined in Paragraph I above.

III. Engine Operation After Cylinder(s) Overhaul or Installation of New Cylinder(s)

A. Engine Starting and Ground Operation

1. Service the engine with mineral oil of the appropriate grade depending on ambient temperature.

NOTE...Corrosion preventive mineral oil MIL-C-6529 can be used but must not be used after the first 25 hours, or six months, whichever occurs first as this oil can cause coking with extended use.

2. Assure that all engine and cylinder bafflings is properly installed and in good condition.
3. Cowl the engine. Start the engine and assure that oil pressure rises to within the specified limits within 30 seconds.
4. Operate the engine at 750 RPM for one minute, gradually increasing toward 1000 RPM in three minutes. Check the magneto circuit for grounding prior to a normal shut-down. Allow the engine to cool adequately and then make a visual inspection for any irregularities.

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5. Start the engine again and operate it at 750 RPM gradually increasing to 1500 RPM over a period of four minutes. If the engine is equipped with a controllable pitch propeller, cycle the propeller allowing only a 100 PRM drop. Return to the idle range and make adjustments to the idle mixture and RPM as required on carburetor engines and to the low unmetered fuel pressure, idle RPM and mixture on fuel injected engines. Position the throttle to 1200 RPM to smooth the engine. Then do an idle mixture check. Refer to the appropriate service information for these fuel system adjustments. Run engine up to full power for a period not to exceed 10 seconds. Visually inspect and correct any discrepancies. Check the oil quantity. Re-cowl the engine in preparation for test flight.

B. Test Flight

1. Ambient air and engine operation temperatures are of major concern during this test flight. Do a normal pre-flight run-up in accordance with the aircraft flight manual. Conduct a normal take-off with full power and monitor the fuel flow, RPM, oil pressure, cylinder head temperatures and oil temperatures. Reduce to climb power in accordance with the flight manual and maintain a shallow climb attitude to gain optimum airspeed and cooling. Rich mixture for all operations except lean for field elevation where applicable and lean to maintain smoothness during climb in accordance with airframe manufacturer's operating instructions.
2. Level flight cruise should be at 75% power with best power or richer mixture for the first hour of operation. The second hour power settings should alternate between 65% and 75% power with the appropriate best power mixture settings. Engine controls or aircraft attitude should be adjusted as required to maintain engine instrumentation within specifications.
3. The descent should be made at low cruise power settings, with careful monitoring of engine pressures and temperatures. Avoid long descents with cruise RPM and manifold pressure below 18" hg.; if necessary decrease the RPM sufficiently to maintain manifold pressure.
4. Any discrepancies detected during test flight or any final adjustments necessary should now be made. The engine can be operated in normal service in accordance with the aircraft flight manual.