AIRCRAFT ENGINE SPECIALISTS

ROTOR

BREAK-IN PROCEDURES

OVERVIEW

Break-in of helicopter engines is accomplished by following a sequence of steps ranging from ground service of the engine to progressively increasing it's power output during operation. Although this Service Instruction contains detailed break-in information, it is impossible to cover all aspects for individual helicopter models. Refer to the Pilot Operating Handbook (POH) for the specific helicopter model and the applicable Lycoming Operator's Manual for the engine.

Key Considerations for Helicopter Piston Engine Break-In:

- Because helicopters always operate at a fixed or rated engine speed, any RPM decrease required during break-in must be performed with the helicopter on the ground and with the rotor engaged. During flight, make all power reductions by manifold pressure alone.
- Some helicopters do not have a red line on the manifold pressure gauge and use all rated power. Some gauges have a red line indicating airframer limitations only, not engine performance parameters. In the case of Lycoming model HIO-360-D1A, graduated manifold pressure values are shown in the Lycoming Operator's Manual.
- Due to differences between helicopter models, refer to the helicopter POH for rotor engagement methods, manifold pressure ratings, and centrifugal clutch or manual-operated belt drive procedures.

SECTION A — GROUND OPERATIONAL TEST

- Refer to the latest revision of Lycoming Service Instruction No. 1014 and confirm the engine has the correct grade and quantity of oil.
  - Position the helicopter facing into the wind to take advantage of prevailing airflow and keep the engine cool.
- Confirm the throttle and mixture control (if applicable) are at the FULL-OFF position.
  - Refer to the helicopter POH for correct start-up procedures. Start the engine and operate at idle RPM (1,200–1,450 RPM) for 5 minutes.
  - Adjust idle mixture (if applicable) and oil pressure as necessary.
  - Perform a magneto check, if applicable, per the POH.
  - Stop the engine.
  - Inspect the engine for oil and fuel leaks.
- Restart the engine and operate at idle speed (1,200–1,450 RPM) for 5 minutes.
- Engage the rotor if necessary, and increase engine RPM to 50%–60% of rated engine speed for 5 minutes with rotor blades at flat pitch (collective full down).
- If oil pressure is within correct operating range and oil temperature is between 180°F and 200°F (82°C and 93°C), with cylinder head temperatures between 350°F and 400°F (177°C and 204°C), increase engine RPM to 80% of rated speed for 5 minutes, followed by 100% airframe manufacturer's rated engine speed for an additional 5 minutes.
  - After the final 5-minute segment, allow the engine to cool as recommended in the POH, then stop the engine.
- Drain the engine oil and perform an oil change. Refer to the latest revision of Lycoming Service Instruction No. 1014.
  - Remove and clean the suction screen in the oil sump.
  - Clean the oil pressure screen and/or replace the oil filter.
  - Make all necessary oil pressure adjustments.
- Reinstall the suction screen and oil pressure screen (or new oil filter); torque per the Table of Limits.
- Add the correct grade and quantity of oil. Refer to the latest revision of Lycoming Service Instruction No. 1014.
  - Start the engine and allow it to operate at 1,450 RPM idle.
  - Engage the rotor if necessary, and increase engine speed to 2,000 RPM.
  - Warm the engine and complete a ground operational check as described in the helicopter's POH.

> **NOTE** *If sufficient oil pressure is not indicated within 30 seconds, stop the engine immediately. Identify and correct the cause before proceeding.*

© 2026 All Rights Reserved

NOTE *For correct break-in, do not allow cylinder head temperature to exceed 420°F (216°C).*

SECTION B — FLIGHT TEST

- Start the engine and operate at 1,450 RPM.
  - Engage the rotor if necessary, and increase engine speed to 75% RPM.
  - With the engine warm, complete a ground operational test in accordance with the helicopter manufacturer's POH, including a magneto check.
- Place the helicopter in hover mode for 10 minutes while monitoring manifold pressure, fuel pressure, oil temperature, oil pressure, cylinder head temperature, and all other applicable engine instruments.
  - If all engine instruments are satisfactory, proceed to cruise altitude.
- Operate at cruise power at 70%–75% of rated power for 30 minutes while maintaining a constant safe altitude.
  - At the end of the 30-minute flight at 70%–75% power, record manifold pressure and engine temperature.
- Increase engine RPM and manifold pressure to the maximum specified limits in the helicopter manufacturer's POH. Hold this power setting for 45 minutes at a constant safe altitude.
  - At the end of the 45-minute segment, again record manifold pressure and engine temperature.
- After the flight test and prior to engine shutdown, operate the aircraft in hover mode for 10 minutes for the time recommended in the helicopter POH.
  - Record manifold pressure and engine temperature.
  - After landing, refer to the POH for cool-down and shutdown procedures.
  - Inspect the engine for oil and fuel leaks. Identify and correct the cause if any leaks found.
  - Calculate fuel and oil consumption.
  - If calculated consumption values exceed specified limits, identify and correct the cause(s). Repeat the flight test before releasing the aircraft for service.
  - Remove the oil suction screen and pressure screen (or oil filter). Inspect for contamination and remove as necessary. If contamination is found, identify and correct the cause.
  - Clean the screen and replace the oil filter if necessary.
- Install the suction screen and oil pressure screen (or new oil filter); torque per the Table of Limits.
- Add the correct grade and quantity of oil. Refer to the latest revision of Lycoming Service Instruction No. 1014.
- After the helicopter has been released for service, operate the engine on mineral oil until oil consumption is stable. Refer to the latest revision of Lycoming Service Instruction No. 1014. During this period, maintain engine power above 65% and monitor all aircraft and engine operating temperatures and pressures to ensure they remain within limits.

⚠ **CAUTION** *Use two crew members to control and monitor all engine instruments, including aircraft and engine operating temperatures and pressures. If any parameters fall outside the tolerances specified in the helicopter POH or engine/aircraft operating manual limitations, stop the break-in procedure immediately. Identify and correct the issue, complete any necessary maintenance, and then resume the break-in procedure.*

© 2026 All Rights Reserved