

# SERVICE LETTER

Service Letter No. L197A  
(Supersedes Service Letter No. L197)  
January 19, 1988

**TO:** All Owners and Operators of Textron Lycoming Piston Aircraft Engines

**SUBJECT:** Recommendations to Avoid Valve Sticking.

In order to minimize valve sticking problems, procedures recommended in this Service Letter should be followed. Depending on the degree of intensity, sticking between the valve stem and guide can severely restrict the valve's opening and closing movements. A sticking valve condition is often identified by an intermittent hesitation, or miss, in engine speed.

Valve sticking can be promoted by contaminants in the oil and by combustion residues. These form deposits on the stem and guide that interfere with the stem's movements. If the valve cannot open or close properly, incomplete combustion will result. This, in turn, can lead to the formation of more deposits and increased valve sticking.

The wrong grade of fuel can also contribute to valve sticking. For example, the extensive use of a fuel with a lead content that is higher than recommended, can intensify the formation of lead deposits. For that reason, among others, Textron Lycoming warns against using any brand of automotive fuel in its engines. For information as to what grades of fuel to use for specific engine models, refer to the latest edition of Service Instruction No. 1070.

Several procedures can be undertaken to prevent, or at least minimize, the formation of lead, varnish and carbon deposits — the prime reasons for valve sticking.

One, is to make sure the engine operates with a clean air filter. If the engine is exposed to extremely dusty conditions, the time intervals between filter maintenance should be reduced accordingly. It is important, too, that the air filter have a good seal, and the rest of the air-induction system have no leaks for unfiltered air to enter.

Another means of minimizing contaminant build-up is to keep the lubrication system clean. Textron Lycoming recommends 50-hour interval oil change and filter replacement for all engines using full-flow filtration system and 25-hour intervals for oil change and screen cleaning for pressure screen systems. Refer to latest edition of Service Bulletin No. 480.

## NOTE

The pressure-screen filter used on some Textron Lycoming engines can be converted to the newer, more efficient full-flow oil filter design. For details, consult the latest edition of Special Service Publication SSP-885.

If the aircraft is not flown regularly, the risk of valve sticking is increased due to the build-up of moisture, acids, gums and lead sludge in the oil. Operating the engine for sustained periods, as when flying, vaporizes harmful moisture and eliminates most of the other contaminants responsible for valve sticking.

Infrequent periods of ground running that do not allow the engine to reach operating temperature can also contribute to valve sticking. On the other hand, should the engine be ground-run too long, overheating may become a problem. Another drawback to prolonged ground-running is that the engine operates on a richer mixture than when flying. During flight at cruise power, the mixture is normally leaned and much of its lead content vaporizes. Ideally, the engine should be leaned to peak exhaust gas temperature (EGT) at cruise power settings. This produces optimum combustion and lessens contaminant build-up. Your Pilot's Operating Handbook should be consulted for proper leaning procedures.

Even in flight it is possible for an engine to overheat. For example, if the baffles that direct cool air over the cylinders are deteriorated or improperly fitted, the engine can develop hot spots. The baffles or ducts controlling air flow to the oil cooler must also be maintained in good condition.

Rapid engine cool down from low power altitude changes, low power landing approach and/or engine shut-down too soon after landing or ground runs should be avoided.

Prior to engine shut-down, the engine speed should be maintained between 1000 and 1200 RPM until the operating temperatures have stabilized. At this time the engine speed should be increased to approximately 1800 RPM for 15 to 20 seconds, then reduced to 1000-1200 RPM and shut-down immediately using the mixture control.

The engine should be operated at engine speeds between 1000 and 1200 RPM after starting and during the initial warm-up period. Avoid prolonged closed throttle idle engine speed operation (when possible). At engine speeds from 1000 to 1200 RPM, the spark plug core temperatures are hot enough to activate the lead scavenging agents contained in the fuel which retards the formation of the lead salt deposits on the spark plugs and exhaust valve stems. Avoid rapid engine speed changes after start-up and use only the power setting required to taxi.

#### NOTE

For information on reaming valve guides, refer to the latest edition of Textron Lycoming Service Instruction No. 1116.

NOTE: Revision "A" — Text revised to include lubrication recommendations and engine ground operations.