

[Print Brief](#)**TELEDYNE CONTINENTAL - AIRCRAFT  
ENGINE****Technical Brief****08 April 1994****Document #: T93-5  
[For Informational Use  
Only]****Subject: USE OF AUTOMOTIVE GASOLINE IN TCM AIRCRAFT ENGINES**

Teledyne Continental Motors would like to remind its customers that the use of automotive fuels in TCM aircraft engines not only represents a potential safety of flight concern, but can also significantly affect cylinder life and durability.

Engines produced by TCM are FAA certificated to a minimum grade of fuel conforming to ASTM D910 - grade 100LL or 100 aviation gasoline. Early engine models such as the O-200, O-300, and O-470 series are certificated to grade 80 aviation gasoline, also conforming to ASTM D910. Detonation margins, compression ratio, rated power, engine cooling, fuel schedules, ignition timing, and fuel system vapor handling are established and FAA certificated based upon use of a fuel conforming to ASTM D910. The use of any fuel not conforming to ASTM D910 may compromise safety and/or result in significant mechanical difficulties.

Automotive gasoline is manufactured to the industry specification ASTM D4814 which does not control or establish limits for octane rating, major anti-knock constituents, or energy density (lower heating value). In addition, critical properties such as vapor pressure and level of contaminants are not tightly controlled as with AVGAS. Vapor characteristics for auto gas are inferior to AVGAS and result in a tendency for auto gas to more readily convert to vapor. In addition, the lower octane rating of auto fuel can lead to detonation and pre-ignition which may damage the engine. Alcohol content of auto fuels may also result in damage to o-rings, seals, and other elastomer components in the fuel system.

It is important to note that automotive gasolines are not subject to the high level of quality control applied to AVGAS. The allowable concentrations of additives, contaminants, and water in AVGAS are precisely controlled by ASTM D910. Automotive gasolines within the United States are changing rapidly to meet ever more demanding environmental regulations. Fuel producers have advised that auto gas will be subject to continuing changes in the future, with additive formulas varying widely. Current Federal and State laws allow properties of automotive gasoline to vary seasonally and geographically. Some states do not even require that automotive gasoline conform to the ASTM D4814 industry standard.

Current aircraft engines feature valve gear components which are designed for compatibility with the leaded ASTM D910 fuels. In such fuels, the lead acts as a lubricant, coating the contact areas between the valve, guide, and seat. The use of unleaded auto fuels with engines designed for leaded fuels can result in excessive exhaust valve seat wear due to the lack of lead. The result can be remarkable, with cylinder performance deteriorating to unacceptable levels in under 10 hours.

Field experience has determined the use of unleaded automotive gasoline to be the cause of premature cylinder replacement due primarily to rapid and severe valve seat recession. Therefore, if you choose to operate your engine on automotive gasoline, valve seat and guide wear may occur at an accelerated rate. TCM strongly advises against the use of such fuels for reliability and safety reasons. Because of this, engine or parts warranty will be voided

where such fuels are used. The use of automotive fuels is readily determined by laboratory analysis.

TCM understands the high cost of flying and is committed to the relentless pursuit of product improvements leading to improved cost effectiveness. Unleaded aviation gasoline and next generation cylinder components are integral to our strategic plan for that future. In the interim, we ask you to consider the adage of "...penny wise..." when considering the use of automotive fuels in your aircraft engine.

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