

Lycoming's press release (04.12.2024) on the root-cause analysis of UND's issue with exhaust valve recession is at best – inconclusive. High aromatic hydrocarbon concentrations in UL94 are not the culprit in this analysis.

ASTM specification D7547 for UL94 describes the use of aromatics as follows – “Although Specification D7547 does not include an explicit maximum aromatic limit, other specification limits effectively restrict the aromatic content of unleaded aviation gasolines. Benzene is virtually excluded by the maximum freezing point of $-58\text{ }^{\circ}\text{C}$, while other aromatics are limited by the minimum heating value and the maximum distillation end point. Thus, the heating value limits toluene to about 24 %. Xylenes have a slightly higher heating value and, therefore, would permit somewhat higher aromatic concentrations; however, their boiling points (above $138\text{ }^{\circ}\text{C}$) limit their inclusion at levels not higher than 10 %. Total aromatic levels above 25 % in unleaded aviation gasoline are, therefore, extremely unlikely.”

So, in the case of UL94, moderate use of toluene (typically 10 – 20%) in the fuel is entirely reasonable and not likely to contribute to valve seat recession. These are not “elevated” levels of aromatics, they are entirely normal having been used across the US for almost 9 years. Swift Fuels stands by our UL94 Unleaded Avgas product. The UL94 fuel used at UND complied with ASTM International D7547 as reported on Lycoming's Service Instruction SI-1070. Aircraft operators should also observe Lycoming's mandatory Service Bulletin SB 388C.

Conjecture about the use of unleaded avgas at high operating temperatures (particularly operating at peak EGT's) remains an open question for these “conforming” engine components. Lycoming has recently suggested that operating an engine at lean conditions for extended periods could starve the engine of fuel needed for cooling, thus contributing hotter temperatures in the cylinder, resulting in more rapid wear of the exhaust valve guide and valve assemblies. On this basis, Swift Fuels would advise pilots to limit extended flight operations at peak EGT or lean of peak when flying UL94 unleaded avgas until the completion of a comprehensive analysis of the exhaust valve issue is documented and confirmed by industry.

NOTE: Swift Fuels' new 100R unleaded avgas contains an anti-valve seat recession additive to prevent this type of valve wear in our 100-octane unleaded avgas product. 100R avgas recently passed over 400-hours of FAA-conforming engine tests, operating with sustained periods of high CHT's and peak EGT's, with no adverse signs of wear in the valve assembly.

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