

## <http://www.100octaneformyplane.com>

Avgas, A message to our membership

### Background

The aviation industry has recently paid new attention to the future of the most often used fuel in General Aviation piston engines – 100LL. In November 2007, the environmental group, Friends of the Earth, petitioned the Environmental Protection Agency (EPA) to regulate the lead which is found in 100LL Avgas. The EPA in turn issued a notice of petition for rulemaking. In 2008 the EPA issued new limits for atmospheric lead content which impacts many sources of atmospheric lead include lead smelting, military installations, mining, iron and steel manufacturing, hazardous waste incineration and airplane fuels. The EPA has named Avgas as one of the “most significant sources of lead” in the atmosphere which is a leading contributor to the potential phase out of Avgas specifically 100LL.

100LL contains a small amount of tetra-ethyl lead (TEL) used to reduce the fuel’s tendency to spontaneously explode under high loads or high pressure. This detonation can cause catastrophic destruction of an aircraft engine. TEL (often called an anti-knock agent) is what raises the octane rating of Avgas to the 100-octane value needed for high performance, high compression (8.5:1) aircraft engines like those that power most Mooneys. Since most aircraft engines of 150 hp or less can safely operate on Avgas with a rating of 80/87, a lack of 100LL availability is of little consequence to them. No date has been set for the phase out of TEL, and 100LL, but it is reasonable to expect that a reduction or curtailment of 100LL will happen at some time in the not to distant future.

Finding a suitable replacement for 100LL is a significant issue for owners and operators of Mooney aircraft. There is only one supplier worldwide for TEL. With the potential demise of leaded aviation gasoline, they may decide that continued production is not viable which could stop the supply and immediately ground a majority of the fleet. As a sole-supplier, the cost could escalate to unmanageable levels thus driving the price of 100LL beyond economic numbers.

### The Engine Manufacturers

Engine manufacturer Teledyne Continental Motors (TCM) is moving forward with research on 94UL (94-octane, unleaded) as a replacement for 100LL Avgas. They have been accomplishing flight testing in a normally aspirated Beechcraft Bonanza. While flight testing is on-going, and the entire flight envelope has not been explored, TCM is expecting that 94UL will be a suitable replacement fuel for future Continental aircraft engines using Avgas. Questions still exist as to 94UL’s ability to control engine temperatures in high demand situations like high power, high OAT climbs and cruise at high power and high altitude. And testing has not been done on turbocharged TCM engines.

Lycoming Engines has been in opposition to 94UL stating that there is significant performance loss with the reduction in octane. They favor pursuing a 100LL replacement and state that their engines need to be run on the higher octane fuel.

### The Choices Today

Swift Enterprises is developing what it thinks is a suitable replacement for 100LL (100SF) that meets or exceeds the octane rating needed to prevent detonation in high performance aircraft engines. Swift synthetically creates hydrocarbons from bio-mass and claims that their fuel is a suitable replacement for 100LL with no engine modifications needed; there is a 15% increase in range over 100LL; 15% more volumetric energy over 100LL and no additives are required for use.

Testing for 100SF began in 2009 and continues today. Critiques are concerned about the actual cost to the consumer for this fuel. Estimates have been from \$5 per gallon to as high as \$10 per gallon. Since full production facilities have not been built yet, today it is hard to accurately predict the final refinery price and thus the retail price for 100SF.

In 2010, General Aviation Modifications (GAMI) announced that they were intent on developing a replacement for 100LL to be called 100UL. 100UL is to be a new fuel blended from existing refinery products and is expected to yield octane ratings comparable to 100LL. The new fuel is said to be comparable with the current 100LL and can be mixed with it in aircraft and ground fuel tanks. Research is still on-going and production economics have not been predicted.

### Who’s Working on This

The Aircraft Owners and Pilots Association (AOPA), Experimental Aircraft Association (EAA), General Aviation Manufacturers Association (GAMA), National Air Transportation Association (NATA), and National Business Aviation Association (NBAA) along with representatives from the petroleum industry and the engine manufacturers are working with the EPA and FAA toward developing a strategy for the reduction in lead emissions from GA aircraft. Because of the size of this group, and the sometimes conflicting agendas of some of its participants, MAPA doesn’t have faith that they will accomplish much in the near term.

In addition, the type-specific aircraft organizations American Bonanza Society (ABS), Cirrus Owners and Pilots Association (COPA), Malibu Mirage Owners and Pilots Association (MMOPA), and MAPA have joined together as an advocate group – Clean 100-Octane Coalition, ([www.100octaneformyplane.com](http://www.100octaneformyplane.com)) to be a voice for General Aviation and each of our group’s

concerns. As such, "Clean 100-Octane Coalition" will work to represent the current Avgas users as discussions go forward. We will make sure that the end-user's voice is heard by the engine manufacturers, FAA and EPA.

#### What Can You Do?

You can take some time to discuss the Avgas issue with other general aviation pilots at your local airports. There is a large segment of our community that are still unaware of the potential threat to our aircraft, and aircraft values if 100-octane Avgas is made unavailable or uneconomical for whatever reason. Contact any pilot association with which you are affiliated (AOPA, EAA etc.) and express your concerns for a suitable 100-octane replacement.

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