September 20, 2011

Dear Beechcraft J35 Owner,

By this time, most of us have seen FAA's SAIB dated 14 Sept, 2011 announcing the approval of another avgas fuel formulation, entitled 100VLL. If you haven't seen the document, here is a link:

http://www.100octaneformyplane.com/uploads/100VLL_Fuel_Approval__9-11.pdf

Several Clean 100 representatives have commented that they are fielding the question; "What does this mean for me", meaning, of course, will this have any effect on my airplane or my flying? The short answer is "No, it won't."

But I am not a fuels expert, so I placed a call to the Clean 100 resident avgas expert, Paul Millner, an engineer for Chevron and Clean 100 representative for the Cardinal Flyers. Below is my simplified version of his explanation……..

Background:

100 octane {MON} fuel is constructed from base stocks which are shared with other motor fuels. The refiner adds tetraethyl lead {TEL} to his base stock to create the 100+/- octane fuel that is dispensed at your local FBO. The amount of TEL necessary to produce a 100 octane fuel depends upon the octane of the base stock. The base stock octane is known as the "clear" octane. Different refiners employ differing technologies and feedstocks to produce their base stock, with different final clear octane values. The clear octane range is large – arguably 91 to 99 octane, before lead addition. So, with the goal of producing 100 octane, a base stock of clear 91 octane requires more TEL than one of 99. This is key for our understanding.

The D910 Spec:

D910 specifies that 100LL must contain lead, but no more than 2 mL TEL/finished gallon of product. Any avgas formulated with up to 2 mL TEL/finished gallon is 100LL. In addition the D910 spec, revision 11 dated 1 May 2011, now includes 100VLL, limiting lead content to 1.6 mL TEL/finished gallon. Any avgas formulated with up to 1.6 mL TEL/finished gallon is 100VLL. ***This fuel is also 100LL!*** Finally, a formulation for 100ULL {the "U" is for "Ultra"} may be in the works, with a further TEL reduction to {speculating} 1 mL TEL/finished gallon. ***Such a fuel would also be 100VLL and 100LL!*** All these products are {or would be} blue in color, and indistinguishable from each other at the pump.

And all have been in production for quite some time, labeled as 100LL.

D910 also specifies 100/130, currently only sold in Utah and Hawaii. This fuel is allowed to contain up to 4 mL TEL/finished gallon, yet its performance specifications are no different than these other fuels. It is distinguishable from these other fuels by its green color. Except for the color, 100LL, 100VLL and 100ULL could additionally be considered 100/130!

For those of you who are interested in purchasing a copy of the D910-11 specification {$40}, here is a link:

http://www.astm.org/Standards/D910.htm

Examples:

Refinery A employs a technology with feedstocks that produce an unleaded avgas blend of 98 octane clear, before lead addition. This fuel very nearly meets spec without any TEL. But it must have lead to qualify, and needs a small octane boost. So a small amount of TEL is added to bring the fuel to spec. Perhaps only 1 mL/gallon is added which makes it {again, speculating}100ULL. ***And it is also 100LL and 100VLL.*** Such a fuel is likely present in some FBO fuel farms today, labeled as 100LL, and has been ever since this refinery has been manufacturing avgas.

Refinery B employs a different technology, has different feedstocks, and produces an unleaded avgas blend of 91 octane clear, before lead addition. Perhaps the entire allowable 2mL/gallon is required to meet the 100 octane requirement – this fuel is 100LL, but this refiner will not be able to produce 100VLL or 100ULL unless technology, feedstocks, and/or blend components are changed. This fuel is also in FBO fuel farms today.

And, of course, everything in between.

A Few Comments:

1. The FAA document approving the use of 100VLL is essentially an acknowledgement of a fuel formulation already in the field.
2. This does not replace, or eliminate, the approval for 100LL.
3. We might expect a similar announcement at some future date for 100ULL.
4. None of the refineries unable to produce 100VLL can necessarily be expected to upgrade their technology or feedstocks – if 100VLL {or 100ULL} were to become the limiting standard, these producers could well cease avgas production.
5. The performance of our airplanes is unaffected by this – the performance characteristics are the same for all these fuels. And nearly all of us who fly in multiple regions of the country have purchased and burned 100VLL and perhaps what, at some future date, might be designated 100ULL.
6. This announcement does not mitigate the requirement to locate an unleaded 100 octane fuel. Maybe it shows good intentions by GA toward this goal. Others have speculated that this effort is a palliative, targeting the EPA and other environmental groups. You'll need to make up your own mind in this regard.

Hope that erases any confusion…….

Thanks to Paul Millner for his help…….

Let's Keep 'em Flyin',

Lee B. and your friends at……

The Clean 100 Octane Coalition