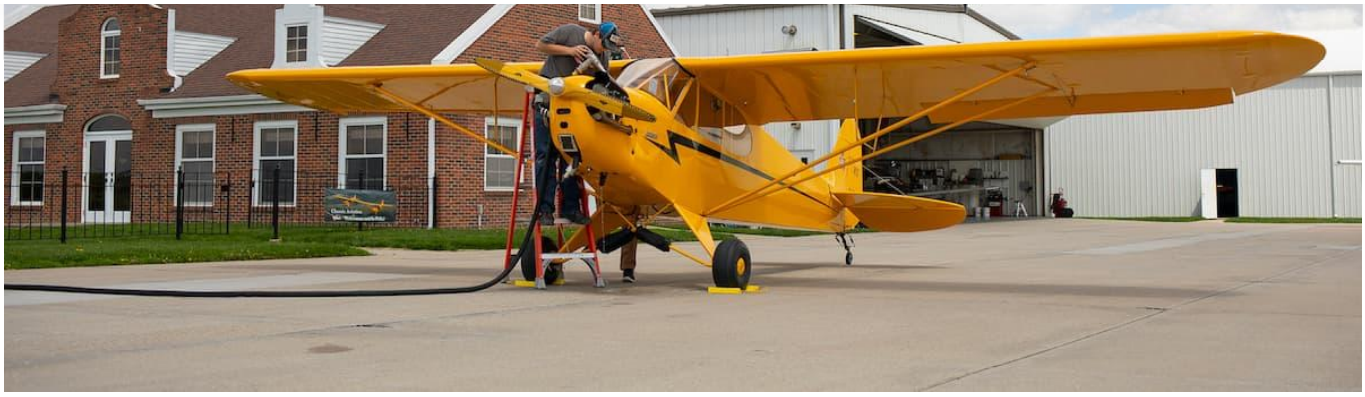
More questions than answers surround unleaded fuel

By Janice Wood · June 12, 2023 · 10 Comments



A worker from Classic Aviation at Pella Municipal Airport in Iowa refuels a Cub. (Photo by Megan Vande Voort)

You have questions about general aviation's transition to unleaded fuel.

So do aircraft manufacturers, the manufacturers of piston engines, FAA officials, and general aviation's advocates.

That was apparent June 5, 2023, during an online update of EAGLE — **Eliminate Aviation Gasoline Lead Emissions** — an initiative launched in 2022 with the goal of eliminating lead in aviation fuel by 2030.

A lot of heavyweights participated in the update, including the head of the FAA's certification services, the top guns at Textron Aviation, Piper Aircraft, CubCrafters, and Lycoming, as well as the Aircraft Owners and Pilots Association, General Aviation Manufacturers Association, Experimental Aviation Association, and more.

One word could sum up the update: Transparency.

Without it, the FAA, engine manufacturers, aircraft companies, FBOs, and you — the general aviation pilot and aircraft owner — can't transition to unleaded fuel.

"We need to certify and test these fuels against the ASTM standards," said General Aviation Manufacturers Association President Pete Bunce. "We're in new territory — we need to know the specifications and the chemical composition of these fuels. We need to know that our customers are going to be safe."

Textron Aviation's Ron Draper echoed Bunce's comments.

"We're excited by the innovation in fuels," he said. "But we desire more transparency and the ability to test these fuels in our airplanes."

He noted that the company — which has produced more than 250,000 airplanes with a "vast majority" still flying today — hasn't had the chance to test any of the unleaded fuels that are vying to replace 100LL.

Neither has Piper, CubCrafters, or Lycoming.

"We can't endorse it until we test it and fly the heck out of it," Draper said.

But why haven't they tested it yet? Because there just isn't enough of the candidate fuels available.

And what that means is that we still don't know what we don't know.

What Do We Know?

Some progress has been made.

There are four fuels that are possible contenders to replace 100LL, with the hope that all four get approved so there will be some competition in the marketplace.

One has already been approved: General Aviation Modification's G100UL. It was **approved in September 2022** through the STC process, which means if an aircraft owner wants to use the fuel, they'll have to buy an STC from GAMI.

GAMI officials are in the process of commercializing the new fuel, with hopes that it will be at airports in the next year or so.

Swift Fuels is also going through the STC process for its 94 octane fuel.

The other two candidate fuels are going through the FAA's **Piston Aviation Fuels Initiative** (PAFI).

One, from LyondellBasell/VP Racing, is nearing completion of its "final initial phase" testing, while the other, from Phillips 66/Acton, is set to begin its "final initial phase" testing soon.

If these two fuels are approved, the FAA will give them fleet authorization. If that happens, the FAA will tell aircraft owners "what they'll have to do to use the new fuel," explained Lirio Liu, head of the FAA's certification services and co-chair of the EAGLE initiative with AOPA President Mark Baker.

"Regardless of the approval path, the FAA doesn't approve fuel," Liu explained. "We approve the use of fuel."

What Don't We Know?

But so many questions remain about how the new fuels will work in a general aviation airplane — especially in a plane that's 20 or 30 years old.

Of course it has to work in the engine, but it also has to be compatible with other aircraft parts, such as fuel pumps, valves, fuel lines and fittings, filters, and more.

There's also a lot of questions about other key characteristics of the candidate fuels, according to Lycoming's Shannon Massey, including:

- Octane
- Toxicity: "It's important we don't replace one fuel with another that's also harmful."
- Corrosive properties
- Density: She noted that the aromatics used in the new unleaded avgas are heavier than 100LL, which could affect an airplane's center of gravity and other performance factors
- Stability: "What happens when it is stored in tank? We have to make sure the octane doesn't drop."
- Production: "We need a fuel that is producible repeatedly."

Questions about these items — and more — are flooding in to the aircraft manufacturers.

Piper's John Calcagno reports the company is getting calls from flight schools, insurance companies, and customers with questions about the impact the new fuels will have on the more than 80,000 Piper aircraft that are flying around the world — most of which are well over 20 years old.

"How will the new fuel impact these older airplanes," he asked. "It's very important that we get this right."

"Our customers rely on fuel to be right," he continued. "We don't want to take that away from them."

And what about experimental aircraft?

EAA's Jack Pelton noted that STCs are not applicable to experimental aircraft. And as the homebuilder is the manufacturer of the aircraft, it will be up to them to test the new fuels to ensure they are compatible with their aircraft.

And that's a big deal because about 20,000 experimental amateur-built aircraft are registered every year.

Asking homebuilders to become fuel testers is taking things "too far," he said.

"Fleet authorization is the way to get around that," he acknowledged.

He also brought up a point no one else had about the "availability and acceptance" of the new fuels: Economics.

How much will the unleaded fuel cost?

"We don't have information on that," he said.

Safety is No. 1

Getting it right is more important than getting it done quickly, all of the presenters noted.

"We've been at this a long time," said GAMA's Bunce.

"We are making progress, but there is still a lot to be done," AOPA's Baker added. "I've often said that if this was an easy thing to do, it would have been done already."

"All the pieces of the puzzle have to come together," the FAA's Liu noted. "That's what EAGLE is set up to do."

And while that is happening, it is imperative that 100LL remains available to general aviation pilots.

“We’re pushing back on communities that are trying to ban 100LL,” Baker said.

Two airports in California — Reid-Hillview Airport in East San José and San Martin Airport — **have already banned 100LL**, with efforts in other communities squelched by GA advocates — so far.

And the initiative is facing one other time pressure: In October 2022, the Environmental Protection Agency (EPA) released a **proposed finding** of endangerment regarding lead emissions from piston aircraft. This is the first step in a very long process expected to take several years to ban lead from avgas.

The EAGLE initiative hopes to beat that ban by finding a solution by 2030.

Learn more about EAGLE at **FAA.gov/Unleaded**.

ABOUT JANICE WOOD

Janice Wood is editor of General Aviation News.

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Comments

John R. Prukop says
June 13, 2023 at 3:09 pm

Welcome to the world of another Bogeyman and the Scama-A-Rama game of let's make some more money off the unsuspecting recipients, with bureaucratic blender oversight.

Reply

Flying B says
June 13, 2023 at 2:26 pm

How about an detailed update on where G100UL really is now.

Reply

Richard Pottorff says
June 13, 2023 at 9:35 am

GAMI jumped over multiple FAA hoops multiple times before being approved. If I had a plane, I would have no problem burning GAMI100UL in it.

Reply

MD says
June 13, 2023 at 6:35 am

I bought the GAMI 100 octane unleaded fuel STC for my Cessna Cardinal (200HP IO360 for which UL94 will not work).

I have zero concerns whether it will work well or not. GAMI spent the better part of a decade testing it in every configuration, scenario, longevity, ratios with other fuels, and everything mentioned in this article as a concern but didn't bother to mention as already 100% resolved by GAMI.

This fuel solves the problem.

It is being distributed. It works.

There is no confusion in my mind or others' minds who bought the STC.

Reply

Paul Brevard says
June 13, 2023 at 4:34 am

A good place to engage "transparency" is with the use of ASTM D7826-23. GAMI's STC process, for all the good intention and elaborate testing it provides, offers fuel with approval for a wide range of engines, but in the end, it's still approval for one fuel to one aircraft. And each one of those aircraft now shoulder the responsibility to determine how that fuel responds in their equipment and for their mission. An STC is an alteration, not a guarantee.

Reply

Eric Fisher says
June 12, 2023 at 11:08 pm

It been so sad to watch this effort over so many decades to get a unleaded 100 octane fuel for piston aircraft, when the real truth is it will never happen, but it appears no one will live up to the truth. We are so lucky that at least there is UL 94. The manufacturers should have already been designing all new aircraft to use the 94 alternative. Modifications can be made to current engines just like it was done when 115/145 was discontinued. .

Reply

T Boyle says
June 14, 2023 at 3:40 pm

Amen.

But when you say “at least there is UL 94” – there could be, if any airports had it.

Reply

Otto says
June 12, 2023 at 6:38 pm

I’m 63. I expect I will have aged out of flying by the time this stuff shows up at airports.

Reply

Peter Roberts says
June 12, 2023 at 2:57 pm

It should be understood that the introduction of a new gasoline chemistry can affect engine components. The introduction of ethanol gasoline has caused the failure of engine seals and the rubber blatters in the fuel pumps of older & European vehicles.

Reply

Bibocas says
June 13, 2023 at 6:56 am

That’s exactly right, Mr. Peter Roberts. That happened more than 30 years ago. Fortunately it happened in “terrestrials” vehicles and in a lot of them, even in those who have suffered some modifications. Some troubles demanded to stay in the

shoulders of roads. Something different must be thinking in a/c reality. That's what we must face and solve without any foreseeable danger,

Reply

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