

# TAC/PRO

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# THE FIRESTORM RAGING AT THE CENTER OF AN UNLEADED FUEL DEBATE

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FAA'S ROLE IN FUEL  
APPROVALS COULD CENTER  
ON THE INTERPRETATION OF  
A SINGLE COMMA

**T**he competition to fuel the future of general aviation may be decided more by the referees than the players on the field.

On Oct. 30, 2024, General Aviation Modifications Inc. (GAMI) began selling its G100UL unleaded aviation fuel (avgas) product at Reid-Hillview Airport in San Jose, California. It was one of two unleaded avgas producers to roll out a product within the space of a week — the other being Swift Fuels on Nov. 6 in San Carlos, California — marking the first time that Federal Aviation Administration-approved, unleaded high-octane aviation fuels (100 grade or higher) have been available to purchase at any airports in the United States.

The FAA in 2022 approved all spark-ignition, piston-engine airplanes to use GAMI's fuel as part of a Congressionally-mandated phase out of leaded avgas by 2030. Typically, any fuel used in aircraft — whether avgas, jet

fuel or even auto gas — complies with an industry consensus specification: a document that spells out its required properties and attributes, agreed to by many different industry stakeholders. However, Oklahoma-based GAMI instead uses a privately-developed specification, which has received sign-off

from the FAA but not necessarily from aircraft makers, engine manufacturers and fuel distributors.

GAMI has consistently argued that its standard achieves the same level of quality assurance for its product as an industry consensus specification. However, some in the general aviation industry dispute this, and manufacturers including Cirrus Aircraft, Lycoming and Continental Aerospace Technologies (CAT) have said they don't know yet if GAMI's fuel is safe to be used in their aircraft and engines.

Now, new reporting from *The Air Current* details how this debate has made its way to the FAA, which is facing a dilemma over its role in approving these fuels and their specifications — central to an ongoing lawsuit in California and something that may very well be determined by a single comma in the 2024 FAA Reauthorization Act.

Historically, the agency has elected not to weigh in on the relative merits of each of these specifications, in line with longstanding federal policy and its role to only approve specific engines and airframes to use a fuel. However, amid widespread pilot confusion and lawsuits from states and municipalities seeking to stop the sale of 100 octane leaded avgas (100LL) entirely, the FAA is under more pressure to endorse industry

consensus standards as the preferred product specification.

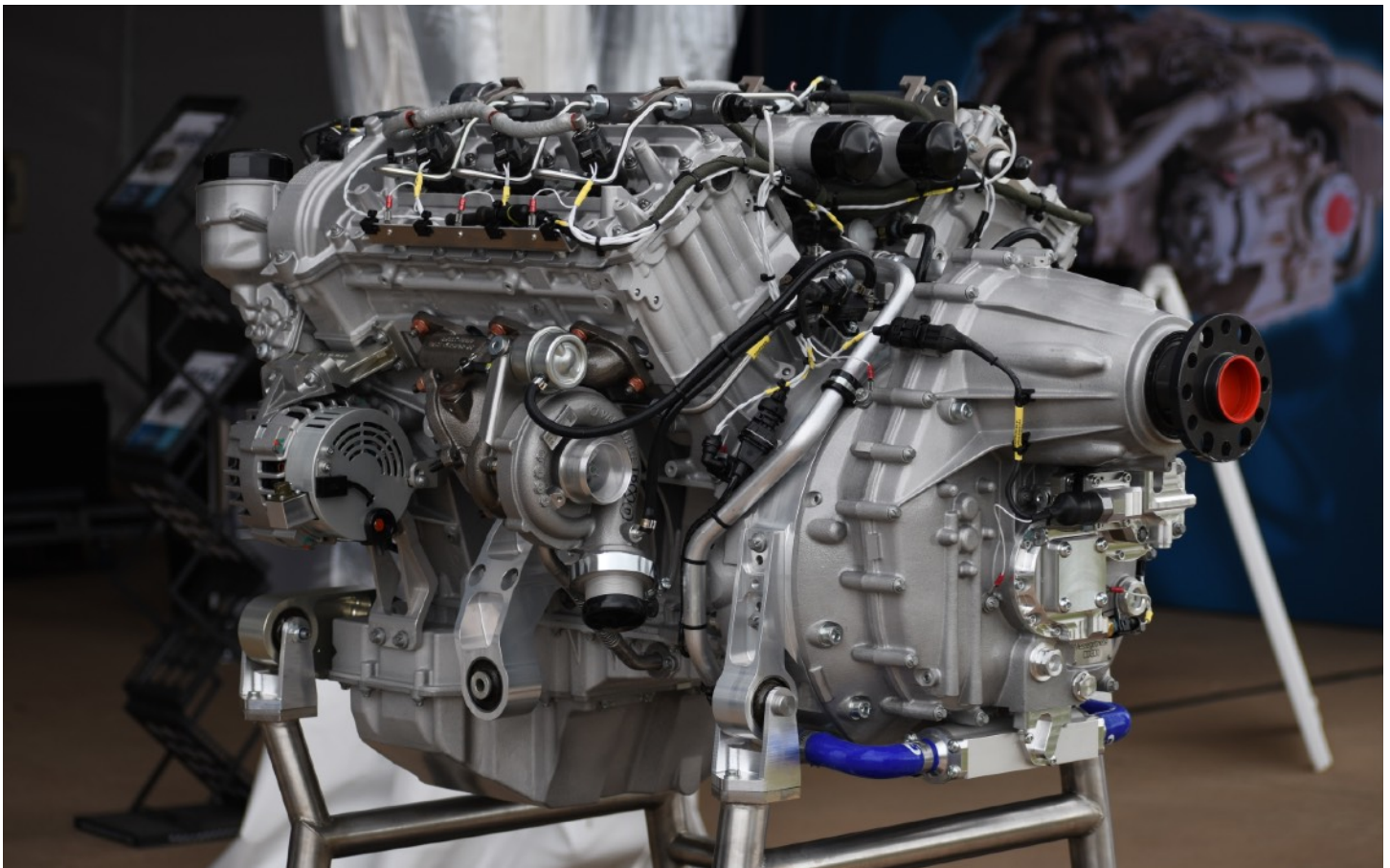
The agency is in a bind, as any action by the FAA could be seen as interfering with the commercial levers of the unleaded fuel industry. With the future of general aviation's lifeblood on the line, *TAC* breaks down the complexity of the standards debate and how it is upending aviation's unleaded fuel roll-out as the industry marches towards its rapidly approaching 2030 deadline.

### Two diverging paths to alternative fuel

**G**enerally, but especially in aviation, any product held to measurable quality standards is required to have a specification. A specification helps ensure that any batch of fuel — which could otherwise have discrepancies from batch to

batch — meets criteria to be considered safe and that it is fit for purpose to be used in aircraft.

For unleaded fuel, the FAA has two paths that a fuel developer can take to fulfill this requirement. Normally, developers work with a standards body like ASTM International to conform to an industry consensus standard — one that is developed with input from a variety of stakeholders. Alternatively, developers like GAMI can create privately-developed fuel specifications by independently establishing the requirements (including testing guidelines, chemical proportions, boiling points and other physical properties) and then working with the FAA to obtain approval.



*Much of the strife caused as a result of the unleaded fuel debate has led some to point out that the continued reliance on leaded fuel — and the subsequent need for alternatives — is the result of stagnant engine technology in general aviation. Alternatives like this Continental CD300 diesel engine have become more popular for newly certified aircraft like the Diamond DA50RG, although they are still expensive and largely not approved for the host of older general aviation aircraft that make up a majority of the U.S. fleet.*



The FAA also has multiple pathways for its approval of engines and airframes to use unleaded fuel. One is via a Supplemental Type Certificate (STC) for certified airframes (experimental aircraft do not require an STC to use the fuel). An STC can use either type of specification and is how both GAMI and Swift have obtained approvals for their products (Swift products utilize ASTM standards). Aircraft manufacturers can also add this approval directly to new aircraft type certificates.

The other pathway is via the Piston Aviation Fuels Initiative (PAFI), which is seeking to produce a blanket “fleet-wide” authorization and requires the use of an ASTM standard. Chemical producer LyondellBassel and VP Racing Fuels are currently moving their UL100E fuel candidate through the PAFI process, but no fuel has been approved since the program was initially spun up in 2014.

The FAA’s reluctance to weigh in on the relative merits of fuel specifications has been driven primarily by longstanding federal policy. While the U.S. Office of Management and Budget (OMB) promotes the use of industry consensus standards by federal agencies in their own work, the advisory circular that sets that guidance specifically noted, “This policy does not establish a preference among standards developed in the private sector.”

The specification for GAMI’s G100UL product, which was only recently released for public inspection, states: “the FAA has, in fact, made a determination that this Specification and Standard for a High Octane Unleaded Aviation Gasoline provides, not only an equivalent, but, in fact, an enhanced level of quality control” when compared to an industry consensus standard, something GAMI says supports its argument about an equivalent level of quality assurance.

Yet when asked about this specific wording in GAMI’s specification, a spokesperson for the U.S. aviation regulator told TAC that “the FAA did not make this statement,” adding that the stamp of approval visible on the front of the document “should not be considered a full-scale endorsement of every statement in the [GAMI] document.”

George Braly, GAMI co-founder and engineer, disagrees. He told TAC by email that the language in question was “explicitly reviewed by the Senior FAA Propulsion Project Engineer” and that “every FAA project engineer, when they sign off a document as ‘FAA Approved’, is doing so as an employee of the FAA and exercising authority that is specifically delegated to each of those engineers to make findings and approvals on behalf of the Administrator of the FAA.” This engineer, whose initials appear on the document, did not respond to a direct request for comment.

As evidence for its argument, GAMI has pointed to FAA Advisory Circular 20-24 which governs the approvals of fuel and oil in aircraft engines and states, “The FAA has determined that independent fuel specifications may be acceptable for definition of aviation fuel operating limitations if they provide an equivalent level of property, performance, and quality control as governmental, military, or industry voluntary consensus-based standards.” In relation to this document, GAMI notes on its website: “As a prerequisite to issuing the FAA Approved G100UL Avgas Specification and Standard, the FAA had to determine that it was the equivalent of an ASTM Consensus Standard.”

### **A complex regulatory mandate**

**T**hose advocating for use of agreed-upon industry consensus standards for aviation fuel contend that such standards have long been the benchmark for



*Despite warnings from manufacturers about the use of G100UL in their products, several photos have surfaced of aircraft being fueled with it anyways. As a part of GAMI's roll out at RHV Airport, the company waived the purchase price for the STC if pilots signed up before the date of a promotional event, where it also provided an aircraft mechanic to install placards and complete appropriate paperwork. Since then, GAMI has begun selling fuel at Watsonville Municipal Airport just south of San Jose, California. (GAMI photo)*

fuels and oils, and provide pilots, aircraft owners, aircraft and engine manufacturers, fuel producers and buyers assurance on how these fuels work in service.

Leaded avgas adheres to the ASTM D910 standard for 100LL which was crafted with input from fuel distributors, insurance companies, and trade groups, among others and dates back to 1947. A similarly diverse collection of stakeholders are helping to craft ASTM standards for unleaded fuels, shepherded in part by the industry-government Eliminate Aviation Gasoline Lead Emissions (EAGLE) initiative which was stood up to help spearhead the use of unleaded fuels in support of the 2030 phase-out deadline for 100LL.

Crucially, however, because of discrete differences in the chemical composition of each fuel, there is no one industry consensus standard that all unleaded fuels are being held to in the same way that 100LL is held to the ASTM D910 standard or Jet-A to ASTM D1655. Instead, there are multiple ASTM standards, each created for a given product moving through the balloting process.

GAMI's decision to utilize a privately-developed standard for its G100UL product instead of one developed through industry consensus has been criticized by many industry players (including much of EAGLE's membership) who say that they don't know whether GAMI's fuel is safe. Cirrus has warned pilots that it does not approve G100UL to be used in its aircraft and doing so will

void the manufacturer warranty (although GAMI disputes Cirrus' jurisdiction over FAA-approved fuels). Piston engine makers Lycoming and Continental Aerospace Technologies have issued similar warnings, and a CAT spokesperson confirmed to *TAC* that the company has “not had the opportunity” to test GAMI's fuel. The four major U.S. distributors of 100LL (Avfuel, World Fuel, Titan and Epic) have declined to transport G100UL at all.

GAMI's Braly said that his decision to not work with ASTM was based in part on several negative experiences he had with the standards committee early on in the process that led him to fear for the security of GAMI's intellectual property, although these claims could not be independently verified by *TAC*. A spokesperson for ASTM did not respond to a request for comment.

Congress waded into this controversy in the 2024 FAA Reauthorization Act, which specifically empowers the agency to continue issuing unleaded fuel approvals regardless of the standard used. That bill notes that the sale of 100LL can't be restricted at airports that receive federal grants unless an unleaded alternative is approved that “meets either an industry consensus standard or other standard that facilitates the safe use, production, and distribution of such unleaded aviation gasoline, as determined appropriate by the Administrator.”

This language can be interpreted in several different ways. Safe use, safe production, and safe distribution carries a very different meaning than safe use as well as production and distribution. The interpretation depends on the reader's understanding of the role of a comma that would or would not assign a safety qualifier to a fuel's production and distribution, as well as its usage.

Any safety-related mandate is in line with the FAA's authority to audit producers and

distributors. However, any expansion of that mandate to include more general oversight of production and distribution activities conflicts with the agency's own messaging on the commercial aspects of fuel production. The FAA has historically maintained that it only approves fuels for use in specific engines and airframes regardless of standard, and explicitly stated on its website that “unlike all other aspects of aircraft design, the FAA does not regulate the production, distribution, handling, operation, and maintenance of aviation fuel before it reaches the aircraft fuel tanks.”

### The FAA's choice

**A**mid this ambiguity, more pressure has been placed on the FAA to side with one type of fuel specification. Chris D'Acosta, CEO of Swift Fuels, formally made that request on Sept. 24, 2024 in a letter to FAA Administrator Mike Whitaker that was reviewed by *TAC*. In that correspondence, D'Acosta asked Whitaker to “clearly support” the sole use of an ASTM standard for all unleaded aviation gas specifications, an action that could knock GAMI and its privately-developed, FAA-approved standard out of the market unless it also pursues ASTM approval.

“The industry needs to have clarity from the FAA Administrator on this issue — as ambiguity results in legal disputes, confusion in the media, and market ‘inaction’ to move our collective mission forward,” the letter read (emphasis underline original).

When contacted about the letter via email, D'Acosta said “it was a private letter to FAA leadership, but it expresses what I believe is understood as the norm for all US transportation fuels (auto gasoline, jet fuel, diesel fuel and aviation gasoline), plus it reflects the voice of industry managing the global supply chain for avgas, and also OEM's who represent all varieties of piston engine,





*Maria Di Pasquantonio, manager of the FAA's alternative fuels program, speaks at EAA AirVenture 2024 in Oshkosh, Wisconsin, updating eagerly waiting pilots and industry representatives about the FAA and EAGLE's progress with unleaded fuels. These forums at AirVenture have often become flashpoints for the unleaded fuel debate over the last few years, with audience members becoming increasingly more frustrated during the sessions about the lack of clarity and information provided to pilots.*

airframe and rotorcraft products made worldwide – that is: **ASTM International represents the de facto industry consensus standard for aviation gasoline specifications in the US market**” (emphasis original). However, GAMI’s Braly said that D’Acosta’s claim is “contrary to the findings by the Administrator with respect to G100UL.” At the time of this article’s publication, only one 100-octane unleaded aviation fuel has received a specification from ASTM, a product Swift developed in 2016, but ultimately did not bring to market. Swift Fuels has been selling its 94 grade unleaded fuel (UL94) at more than 20 fixed base operators (FBOs) in California for over nine years. UL94 does have an ASTM specification and has approval from the FAA to be used in about 75% of the general aviation fleet.

However, Swift has begun selling its 100-grade 100R product, for which it received its initial STC in September, at select airports in California without an ASTM specification as it waits for approval from the standards body for its production specification. Instead, Swift is using its own FAA-approved, privately-developed specification to begin sales ahead of receiving an ASTM specification.

“Swift Fuels consulted experts and then made the determination that our 100R fuel can perform safely on a restricted use basis on Cessna 172R/S models as we wait for the final completion of the ASTM International ballot for our production specification,” the company said on its website, adding that the testing done as a part of the ASTM process has provided assurances to other partners involved in the sale of the fuel.

## The California challenge

Swift said that the decision to move ahead with a privately-developed standard for 100R on this “restricted” basis was driven primarily by ongoing environmental challenges to 100LL in California that require the more immediate sale of an alternative product. For years, California has been a flashpoint for the rollout of unleaded fuels, with several municipalities passing bans on 100LL sales altogether, spurred by environmental groups that have long highlighted the health issues associated with lead emissions from aircraft, particularly for children.

These issues came to a head in 2011 when the Center for Environmental Health (CEH) sued the major distributors of 100LL in California along with 28 FBOs for failing to notify neighborhoods surrounding airports about the lead emissions from general aviation aircraft. In 2014, the suit was settled via a negotiated consent agreement that required California state airports to sell unleaded fuel with the lowest possible lead rating when such a product becomes “commercially available.”

Now, with these products finally coming to market, the CEH in early December officially filed a plea to the Alameda, California County Superior Court to enforce that agreement, arguing that GAMI’s G100UL is “commercially available” and therefore must be sold across the state<sup>1</sup>. The CEH is arguing that the “refusal” of the defendants (California FBOs and fuel distributors) to sell G100UL even after it has been FAA approved is a violation of that consent agreement.


Groups representing the airports and fixed-base operators argue they are in compliance with the consent agreement by selling UL94,

and that among other points a fuel can’t be “commercially available” without an ASTM standard, as that has been the industry’s benchmark for broader production and distribution, they say. Legal filings show that a hearing will be held on Jan. 28, 2025 to advance these claims.

Principally, the judge is being asked to determine if GAMI’s fuel is indeed “commercially available,” which will decide whether or not airports in California will be required to sell it under the terms of the consent agreement and could significantly steer the pace and scope of unleaded fuel’s rollout.

In an email to TAC, an FAA spokesperson stated, “To date, the FAA has remained impartial as to whether a privately-developed standard (such as the one GAMI has secured for its G100UL product) or an ASTM standard (the industry-accepted benchmark) is the preferred method of securing more widespread industry approval for unleaded fuels.” Despite the mounting pressure on the agency to pick a side, there could be significant ramifications if it were to actually do so. One senior industry leader who spoke to TAC suggested that any overt interference on the FAA’s part could even lead to legal action by fuel developers.

At EAA Airventure Oshkosh 2024, Wes Mooty, the agency’s acting head of aircraft certification, attempted to explain the FAA’s insistence on its limited role to an audience that seemed impatient for a more definitive stance. “I don’t know any other way to say this,” Mooty said. “I’m not trying to be a cop-out here, but it’s not the FAA’s job to determine the economical and commercial side of this, it’s the safety issue.”

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<sup>1</sup> The CEH has not made the same claim of commercial availability for Swift’s UL94 or 100R even though both of those fuels have received approval from the FAA (100R is currently only approved for use in C172 R and S models).