

FAA Pathways to Approve Use of New Unleaded Fuel

There are two pathways available to obtain FAA authorization for the use of a new unleaded fuel:

- (1) FAA aviation fuel fleet authorization process established by Congress; and
- (2) Traditional FAA aircraft type certification process

There are a few differences between these two pathways to approve the use of a fuel – through the traditional STC/AML STC process as well as through our Fleet Authorization/PAFI process. Below is a chart depicting the various attributes of each pathway.

Through the traditional STC/AML process, an applicant is responsible for demonstrating that the aircraft and engines meet all of the requirements using the new unleaded fuel. The FAA reviews the compliance data and issues an approval, the STC, which the applicant can sell to customers to modify their individual aircraft to authorize the use of the fuel. The modification includes a change in the fuel placard and limitations, and can affect other attributes depending on the STC.

Under the fleet authorization process, fuels are evaluated through a collaborative industry/government testing program called the Piston Aviation Fuels Initiative (PAFI). The testing procedures and results are shared throughout the PAFI partners, which include engine and airframe OEMs and is intended to provide them with access to the information to be confident in the use of the new fuel. Upon successful completion of testing, the FAA will issue a fleet authorization which aircraft owners can use to modify their individual aircraft to authorize the use of the fuel.

Since the conclusions of the PAFI testing are not proprietary, the fleet authorization also provides information directly to owners of aircraft with a special, restricted or experimental airworthiness certificate, so that they can modify their aircraft.

Authorization for the use of a lower octane unleaded fuel (UL 91) is planned for the latter part of 2023 through the fleet authorization process, to facilitate broader use and experience with the transition to unleaded fuels. Due to the lower octane than 100LL, approximately 68 % of the general aviation fleet will be eligible to use UL 91.

Paths to Approve Use of Fuel



Attribute	Fleet Authorization	AML STC
Initiator	Fuel Developer or FAA	Applicant (may be any party)
Fuel Specification	Industry Standard (ASTM)	Industry Standard (ASTM) or Independent Specification
Compliance Methods	PAFI Test Methods/Protocols *	FAA ACs or alternative**
Responsibility to Test	FAA	Applicant
Determination of Compliance	FAA with participating OEM review	Shown by Applicant; FAA Approves
Implementation on aircraft with standard airworthiness certificate (approximately 82% of fleet)	<ul style="list-style-type: none"> • Cost: No Charge • Placard: Installed by licensed mechanic • Implementation: Majority Expected to be Minor Alteration with No Form 337 Required • Major Alteration with Form 337 Required - Aircraft Dependent 	<ul style="list-style-type: none"> • Cost: Price of STC • Placard: Installed by licensed mechanic • Implementation: Major Alteration with Form 337 Required - for All Aircraft
Implementation on other aircraft (remaining 18% of fleet)	Authorizes fuel for Light Sport Aircraft (LSA) and provides information to support approval in experimental aircraft	LSA manufacturer must authorize fuel for their aircraft; STC holder may choose to make data available to support experimental aircraft

*PAFI is structured to provide visibility to interested engine and aircraft OEMs in test results. Testing methods and results are shared within the PAFI signatories of an NDA.
 **Applicants may use alternative methods of compliance subject to FAA acceptance

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Regardless of the approval path, the FAA does not approve the fuel itself. The FAA approves the use of fuels, which are defined through fuel specifications. There are two types of fuel specifications summarized below:

- (1) Industry Standard (ASTM Specification); and
- (2) Independent Specification

Types of Fuel Specifications



Attribute	Industry Standard (ASTM)	Independent
Specification Development and Maintenance	<ul style="list-style-type: none"> All participants assure specification is adequate (engine and aircraft manufacturers, fuel experts, fuel producers and distributors) potential issues/gaps reported and resolved through committee 	Specification owner responsible for completeness, and maintenance of specification
Approval Process	Specification approved through industry consensus process, and accepted by the FAA	Specification accepted by FAA
Market	Sold as a Commodity	Sold as a Company Specific Product
Intellectual Property of Fuel Developer (if applicable)	<ul style="list-style-type: none"> IP owner retains rights Any IP must be accepted through industry consensus process (ASTM) to be incorporated in an industry standard 	IP owner retains rights
Scope of Specification	<ul style="list-style-type: none"> Fuel composition Fuel performance Fuel production Fuel quality control and distribution 	<ul style="list-style-type: none"> Fuel composition Fuel performance Fuel production Fuel quality control and distribution
Example Fuels	100LL, UL91, UL94, Jet A, Jet A-1	GAMI G100UL, Swift 100R