LIGHT AIRCRAFT ASSOCIATION

Airworthiness Approval Note: LAA-999-413 supplement 5

Aircraft Type: All LAA aircraft (subject to engine type)

Issue 1	Initial issue	16/11/11
Issue 2	Continental C75 added to Appendix 1	23/11/11
Issue 3	High compression Lycoming O-235 models deleted from Appendix 1	24/11/11
Issue 4	Alternative criteria 3 in section 5 of this AAN added and resulting additional models of -360 Lycoming engines added to Appendix 1. Also, for clarity, suitable Lycoming -320 models listed in Appendix 1.	02/12/11
Issue 5	Additional Lycoming models added following issue of Lycoming Service Instruction 1070R. Briggs and Stratton engine included in Appendix A. Jabiru 2200 and 3300 compression ratio and combustion chamber options expanded in Appendix A.	23/04/12
Issue 6	References to Cirrus Major, JPX 4TX75/A and Potez 4E20 added, document reformatted.	10/12/12
Issue 7	Additional text included to add appropriate Superior Air Parts engines into eligibility list, to include latest issue R2 of EASA SB 2011-01, Lycoming SI 1070S and to include additional Lycoming engines and advice about oil choice introduced therein.	29/04/13
Issue 8	Text altered to include UL91 fuel from any approved supplier rather than specifically from Total.	10/03/14
Issue 9	Extension of applicability to include UL94 fuel. Extension of applicability to include non-certified Lycoming and 'clone' engines other than Superior; updates to eligibility criteria. Update of applicable engines in Appendix 1	14/08/25

Approved: 

Dated: 14 August 2025

For the Light Aircraft Association
CAA Approval DAI/1148/72

1. Summary

This Airworthiness Approval Note has been raised to approve the use of Avgas UL91 and UL94 fuel in applicable UK registered aircraft operating on a Permit to Fly, where the Permit to Fly has been issued on LAA recommendation.

2. Description

Avgas UL91 fuel is a type of unleaded aviation fuel which is essentially the same as 100LL fuel but without the addition of any tetraethyl lead (TEL). This results in an anti-knock rating which is lower than that of 100LL fuel and broadly equivalent to EN228 unleaded Mogas, but without potentially problematical octane-boosting additives such as ethanol or ETBE commonly found in Mogas being present. The anti-knock characteristics are superior to those of Grade 80/87 Avgas.

Originally, UL91 fuel was introduced to the UK by Total in 2011. In 2013, Warter Aviation entered the market with a fuel of the same UL91 specification. In response, at issue 8 this AAN was altered to include the approval of UL91 fuel supplied by refiners/suppliers other than Total.

In 2025, UL94 fuel began to be supplied in the UK by Greenergy. This fuel is similar to UL91 but replaces some of the chemical constituents with iso-octane, to increase the MON to a minimum of 94.0. Both UL91 and UL94 conform to the specifications of ASTM D7547. From 2025, UL91 is to be dyed green and UL94 is to be dyed red. UL94 fuel exceeds the knock-rating specifications of UL91 and is therefore approved for use on any aircraft that has previously been approved to use UL91.

3. Basis for Approval

The approval of this fuel is based on compliance with applicable quality standards for aviation fuel. Both engine and airframe/fuel system issues have been considered in making this assessment.

It should be noted that UL91 fuel is a different specification to 91/96 aviation fuel (supplied by Hjelmco Oil) and has not been shown to be equivalent at this stage in the investigation. Approvals to use 91/96 fuel must not be taken to mean approval to use UL91 fuel.

4. Investigation

The LAA has been in extensive contact with representatives of Total during the development of UL91 fuel, which has been developed in close consultation with engine manufacturers Rotax and seeks to address the problems with lead fouling experienced when 100LL fuel is used in Rotax and other modern engines. As an aviation fuel manufactured and supplied to the applicable aviation standards, the uncertainties of quality as delivered to the aircraft fuel tank associated with Mogas fuel are avoided. Materials compatibility problems associated with the additives in Mogas are also avoided.

EASA CS-STAN Standard Change 202c approves the use of UL91 where the engine has been approved for use with UL91 and the aircraft is approved for use with conventional Avgas; or the engine and airframe are approved for operation with avgas Grade 80/87; or the engine and airframe are approved for operation with Mogas to EN228.

FAA SAIB HQ-16-05R1 approves the use of UL94 in all applications that are approved to use UL91 or Grade 80/87 avgas.

5. Approval

The LAA accepts the use of UL91 or UL94 fuel in any LAA aircraft which meets one or more of the following criteria:

1. The engine type is one where the engine manufacturer has approved the use of UL91.

2. The engine type is one of the specific models of Continental, Hirth two-stroke, Jabiru, Rotax two-stroke, Rotax four stroke or VW based engines accepted by the LAA for use with unleaded Mogas to EN 228, in accordance with the requirements specified on the LAA website, including the specific requirements identified for the particular models of engine identified (e.g. reduced compression ratio)

3. The engine type is accepted by the LAA as suitable for use with unleaded Mogas RON95/MON85 to EN 228, but individual airframe/fuel system requirements have not been identified as such on the LAA website, including

    - Briggs and Stratton 0114-E1 (Colomban conversion)
    - Potez 4E20
    - JPX 4TX75/A

4. The engine type is approved by the engine manufacturer for use with Grade 80/87 Avgas. (For Lycoming engines satisfying this criterion, see item 5 below.)

5. The engine type is a Lycoming engine of a type approved by Lycoming for use with UL91 or UL94 fuel in Lycoming Service Instruction 1070 in its latest issue.

6. The engine type is a non-certified Lycoming or Lycoming 'clone' engine (e.g. assembled by Superior Air Parts) approved by its manufacturer for use with unleaded Mogas to EN 228 or UL91, and having a compression ratio of 8.5:1 or less.

Appendix 1 lists popular engine types established to satisfy these criteria but is not a complete list.

This approval does not extend to engines that have been modified from the basic type in any manner that affects the effective compression ratio or combustion chamber configuration. In that case, individual approval must be sought from LAA Engineering.

Due to the lower vapour pressure of UL91 and UL94 fuels compared with that of Mogas, the special operational limitations in terms of operating altitude and fuel temperature normally applicable to engines operating on unleaded Mogas do not apply when UL91 or UL94 fuel is used.

6. Recommendations

It is recommended that having established that the individual aircraft concerned is suitable for use with UL91 or UL94 fuel in accordance with the criteria in this AAN, suitable placards should be fitted adjacent to the fuel filler cap identifying that UL91 or UL94 fuel may be

used, and that in the case of aircraft with a POH or flight manual, a note is added to this effect in the appropriate section, referencing this AAN.

APPENDIX 1

Engine types that satisfy the criteria in Section 5 of this AAN include the following:

Manufacturer	**Model**
ADC/Blackburn	Cirrus, Cirrus Hermes, Cirrus Minor, Cirrus Major, (all models/variants)
Aeronca	E113C
Airdisco Renault	120BHP
Anzani	Fan type 3 cylinder, Y type 3 cylinder
Armstrong Siddeleley	Genet (all variants), Mongoose 3C
Blackburn	Bombardier 20801 (see also 'ADC' above)
Carden Ford	Type C
Briggs & Stratton	0114-E1 (Colomban conversion)
Clerget	9B, 9BF
Continental	A40, A50, A65, A75, C75, C85, C90, O-200, O-300, C125, PC60, W670-6A
ENMA	Tigre GIV, GIVA, GIVB
De Havilland	Gipsy I, II, III, Major, Minor
Fairchild	Ranger 6-440-C2
Gnome	50
Hirth	2703, 2705 R06, 2706, F10A-2A, F30, F36, HM 504A-1, HM 504A-2
Hispano Suiza	Type E
Jabiru	Only those 2200A and 3300A engines with compression ratios not exceeding 8.0:1 with the original wedge type combustion chamber or 8.3:1 with the later 'high octane' type combustion chamber or modified high octane combustion chamber. Jabiru Service Letter JSL 007-4 refers.
Jacobs	R-755-9
JAP	J99
JPX	4TX75/A, PUL 212
Kinner	R55, R56, R-540
Lambert	R.266
Le Blond	AE 5DF
Le Rhone	80 HP, 110 HP
Lycoming	O-145 O-235 'C', 'E' 'H' 'K' 'L' 'M' 'N' and 'P' series models only. (Other O-235 series including 'F','G','J' series not acceptable) O-290-D, -D2, -G, -G4 O-320- 'A','B' 'C' 'D' and 'E' series AEIO-320- 'D' and 'E' series IO-320- 'A' 'B', 'D' and 'E' series AIO-320 'A', 'B' and 'C LIO-320 'B' only AEIO-320 'E' series O-340-B

	O-360- 'A','B', 'C','D','F', 'G' and 'J' series AEIO-360- 'B' and 'H' HO-360 'C' series only IO-360 'B', 'E', 'L' and 'M' series HIO-360 'B' and 'G' series, LIO-360 'M' series, LO-360 'A' series IVO-360 'A' series O-435 'A' and 'C' series GO-435-C and C2 (C2 only if fitted with carb settings 10-3391-1 or PS-5BD) GO-480 'B', 'D' and 'F' series O-540- 'A' 'B' 'E' 'F' 'G' 'H' and 'J' series AEIO-540-'D' IO-540 'C' 'D' 'N' 'T' 'V' 'W' 'AB' and 'AF' series VO-540 'A' and 'B' series
Pobjoy	R, Niagara, Cataract, (and their variants)
Potez	4E20, 4E20A
RAF	1A
Renault	4P-03, 4P-05, 6A-10A, 6Q10B
Rotax	912 series (including 912iS), 914 series, 915iS, 447, 503, 582, 618
Salmson	7AC, AD9, 9AB9AB
Shvetsov	M-11D
Siemens	SH14A, SH14A4
Superior	XP-320 carburetted or fuel injected models with compression ratios not exceeding 8.5:1 XP-360 carburetted or fuel injected models with compression ratios not exceeding 8.5:1
TVAL	Replica Mercedes DIII
UL Power	UL260 series, UL350 series
Vedeneyev	M14P, M14PF
VW	Conversions with compression ratio not exceeding 8.0:1
Walter	Micron II & III (and variants), Minor 4-III
Warner	145, 165, 185, Super Scarab S50
Wolseley	Viper 200

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