Australian Government
Civil Aviation Safety Authority

Airworthiness Bulletin

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Unleaded Aviation Gasoline

An Airworthiness Bulletin is an advisory document that alerts, educates and makes recommendations about airworthiness matters. Recommendations in this bulletin are not mandatory.

1. Effectivity

Australian registered aircraft fitted with Spark-Ignition Engines conducting operations utilising Unleaded (UL) Aviation Gasoline.

2. Purpose

The purpose of this document is to provide a set of guiding principles and parameters which have been identified as having either a direct or indirect impact on the selection and use of unleaded (UL) aviation gasoline, (avgas).

3. Background

CASA requires the operator and pilot in command of an aircraft to ensure that before flight begins, the aircraft has been fuelled with fuel that is not contaminated, degraded or inappropriate, Civil Aviation Safety Regulation (*CASR 1998*) 91.465 *refers*.

The use of any fuel is dependent on that fuel being listed, by specification and grade, for a particular purpose within an approved and recognised data source. It matters not that UL avgas is simply identified as an approved fuel for certain aircraft or engines, if the fuel is not to the specification listed (e.g. ASTM D7547), then it cannot be used.

The use of UL avgas in aircraft spark-ignition engines is only acceptable when:

a) The fuel is listed as an approved fuel in the aircraft and/or engine manufacturers approved data,

   Note: Approved data includes the Airplane Flight Manual (AFM), the Pilots Operating Handbook (POH), aircraft and engine manufacturers approved maintenance data (CAR 2A) and the aircraft and engine Type Certificate Data Sheet (TCDS).

b) Alternatively, the fuel is approved by a National Airworthiness Authority of a recognised country, or locally under Part 21 through an avenue such as Supplemental Type Certificate (STC).

c) The fuel conforms to a specification detailed in that approved data.

d) The conditions for the use of the particular fuel are fully complied with.

4. Recommendations

To establish the actual suitability of a particular fuel and any associated limitations, all pertinent data sources for the aircraft/engine combination are to be consulted prior to making a final determination.

The following points should be considered when evaluating the acceptability of a particular fuel for use.

a) The manufacturers approved data sources identify the minimum Motor Octane Number (MON) to meet or exceed the octane demand for each engine model. Typically, higher fuel grades under the same specification can be used.
For example, ATSM D7547 Grade UL 94 avgas meets or exceeds all performance requirements of ATSM D7547 Grade UL 91 therefore, it can be used in its place. However, the use of UL 91 avgas in an engine that has not been specifically approved for its use can cause extensive engine damage or lead to an in-flight failure due to the lower MON of the fuel.

b) To transition from leaded avgas operations to UL avgas operations the airframe/ engine manufacturer may require specific maintenance actions to be completed prior to introduction of the approved unleaded fuel.

   Note: If leaded fuel is used after using unleaded fuel, the manufacturer may require the transition procedure to be completed again before returning to use of approved unleaded fuel to ensure correct engine operation.

c) When using an approved unleaded fuel an oil additive that has an anti-scuffing agent, or an equivalent finished product may be essential to help maintain a film of lubricant and help protect the engine during initial start-up.

d) Where a manufacturer provides latitude in the operating hour maintenance intervals for UL avgas usage, the operator is entitled to utilise those extended thresholds, conditional upon the engine being continuously operated on the approved UL fuel, see point b).

e) The ability to continuously operate on any approved and commercially viable UL avgas is also contingent on the fuel industry coordinating production and creating the necessary infrastructure and distribution channels to support its widespread usage.

f) In working toward the transition to lead-free aviation fuels, without compromising the safety or economic health of the existing piston engine fleet, CASA will be guided by;

   1) the Piston Aviation Fuels Initiative (PAFI) research and development program, PAFI - Background and Program Update (FAA)
   2) the Eliminate Aviation Gasoline Lead Emission (EAGLE) initiative, EAGLE Initiative – A Path to a Lead-Free Aviation System (FAA)
   3) the qualification, certification, and issuance of eligible fleet authorisations for each fuel specification and grade, (for example G100UL, G100UL® high octane unleaded aviation gasoline), and
   4) legislative requirements passed by the Australian government.

5. References (typical)

Lycoming SI 1070 - Specified Fuels for Spark-Ignited Gasoline Aircraft Engines

Lycoming SL L270 – Extended Maintenance Intervals for Engines Operated on UL Fuels

Continental Press Release – Use of UL 91/94 in Selected Engines

Continental Installation & Operation Manual, (Engine Specific) – Approved Fuels

Cessna SB SEB-28-04 Fuel – Placard Installation for use of VLL & UL Avgas

Note: Refer to the latest published revision

6. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link email address:

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