

Continuing Airworthiness Notice – 28-001



Ethanol Blended Auto Fuel

20 August 2007

Issued by the Civil Aviation Authority of New Zealand in the interests of aviation safety. A Continuing Airworthiness Notice (CAN) is intended to alert, educate, and make recommendations to the aviation community. A CAN contains non-regulatory information and guidance that does not meet the criteria for an Airworthiness Directive (AD). The inspections and practices described in this CAN must still be carried out in accordance with the applicable NZCAR Parts 21, 43 and 91. CAN numbering is by ATA Chapter and a serial number for the next CAN in that ATA Chapter.

The contents of this notice are ADVISORY ONLY and are NOT MANDATORY.

Applicability:

Aircraft operating on unleaded auto fuels also known as motor gasoline (MOGAS). Engines operating on MOGAS may be installed on, but are not limited to, aircraft in the microlight and experimental category.

Purpose:

This Continuing Airworthiness Notice (CAN) advises operators using MOGAS that ethanol blended auto fuels are not suitable for aircraft use.

Background:

Ethanol is a liquid alcohol used either as a main fuel or as a blending ingredient in fuel. Bio-ethanol blended auto fuel is now publicly available at some service stations. However, auto fuel free of ethanol is still available. Bio-ethanol blended fuels will become more widely available in the next few years as New Zealand oil companies move to meet government biofuel sales objectives.

Most aircraft engine manufacturers explicitly prohibit the use of ethanol blended gasoline, and most aircraft type certificate data sheets (TCDS) and/or Aircraft Flight Manuals (AFM) prohibit the use of ethanol or ethanol blended gasoline. Unless the TCDS, AFM (or it's supplements) lists ethanol as an acceptable fuel, then its use is prohibited.

Ethanol is hygroscopic by nature and has the tendency to absorb and combine with water. Aircraft fuel systems are particularly susceptible to water contamination. Over-wing filler caps are often in exposed positions, particularly if the aircraft is parked outside and water may enter the tank during refuelling. Atmospheric water vapour continually enters the tank via the venting system. At altitude the external skin cools and condensation can form inside the tank.

The ethanol/water mixture has a higher density than pure fuel and settles to the bottom of the fuel tank. The mixture volume can soon exceed the capacity of the gascolators and fuel tank sump, permitting water/fuel mixture to be drawn into the engine. This may result in partial or total power loss.

At altitude the OAT decreases and the entrained water may begin to freeze. The resulting slush can block filters.

The ethanol can be acidic, especially when in contact with water, and this can cause corrosion and sedimentation of fuel system components.

Ethanol blended into petrol also increases the already high vapour pressure of the base petrol, which increases the possibility of vapour lock at high ambient temperatures, and also at altitude.

Elastomers in the fuel system may deteriorate due to incompatibility with ethanol, leading to fuel leakage and the risk of fire.

Recommendation:

Ethanol blended fuels should **not be used in any aircraft** including those operating on MOGAS, unless an appropriate STC or modification is embodied and/or the blended fuel is permitted by the aircraft flight manual.

Enquiries:

Enquiries with regard to the content of this Continued Airworthiness Notice should be sent to:

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