

Accident Synopsis

On October 1, 2016, at 1310 eastern daylight time, a Culver PQ-14A, N4648V, was destroyed during collision with trees, terrain, and a commercial building during a forced landing after takeoff from Hickory Regional Airport (HKY), Hickory, North Carolina. The commercial pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the personal flight conducted under the provisions of 14 Code of Federal Regulations Part 91.

Analysis of Culver PQ 14A Accident

Factual Findings

1. The aircraft experienced a power loss during taxi, and subsequently during takeoff.
2. There was fuel present on-board the aircraft at the time of the accident based upon fuel samples being taken, and the strong fuel smell at the accident site.
3. Fuel system continuity was verified and no apparent blockages were found that would cause a power loss.
4. There were no apparent signs of fuel contamination in the fuel samples taken at the accident site.
5. The fuel being used by the aircraft had the appearance and smell of automobile gasoline.
6. No fuel analysis was conducted on the fuel samples.
7. There were no obvious signs of engine power loss due to a mechanical failure:
 - a. Thumb compression was present.
 - b. The engine driven fuel pump was functional.
 - c. The carburetor did not exhibit any apparent contamination, nor mechanical failure.
 - d. The magnetos were able to produce spark energy.
8. The weather does not appear to be a factor in the accident:
 - a. Day
 - b. Clear
 - c. Light winds
 - d. Temperature/Dewpoint was 73.4F (23C)/51.8F (11C)

Analysis of Factual Findings

1. The pictures of the spark plugs show what appears to be normal operation based upon industry guidance documents.
2. A supplemental type certificate (STC) is required to use automobile gasoline in a certificated aircraft and aircraft engines.
 - a) No STCs could be found for the Culver PQ 14A aircraft.
 - b) There is an automobile gasoline STC offered by Petersen Aviation for the accident aircraft's Franklin 6A4-150-B3.
 - c) The aircraft records do not indicate an STC for the use of automobile gasoline for either the engine or airframe. NOTE: The aircraft was being operated on a "Limited" airworthiness certificate.
3. The use of automobile gasoline containing ethanol in aircraft is prohibited by the existing STCs.
4. The FAA has written an SAIB on the use of automobile gasoline containing ethanol, CE-07-06:



SAIB CE-07-06 -
Ethanol In Auto Gas

- Ethanol increases the ability for water to be entrained within gasoline, due to its hygroscopic nature.

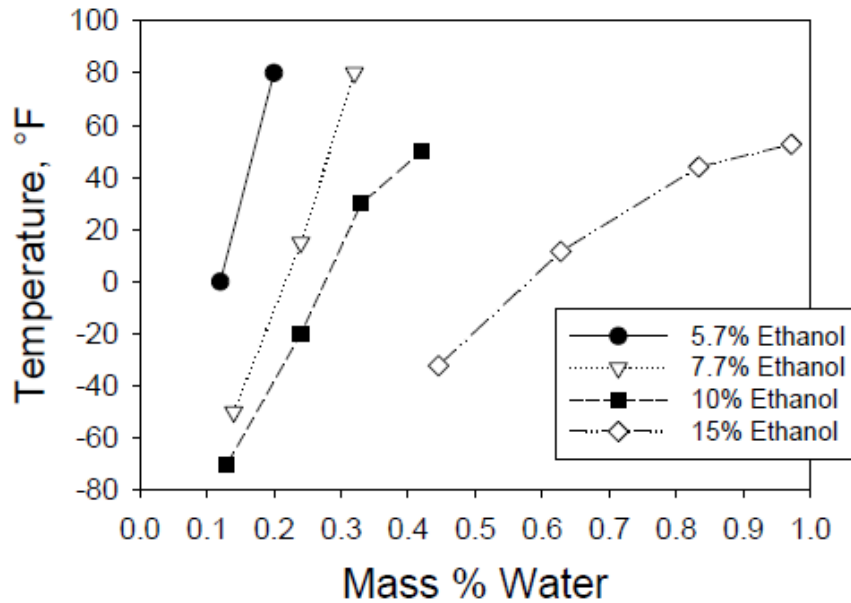


Figure 1: Water tolerance (phase separation temperature) of ethanol-gasoline blends.

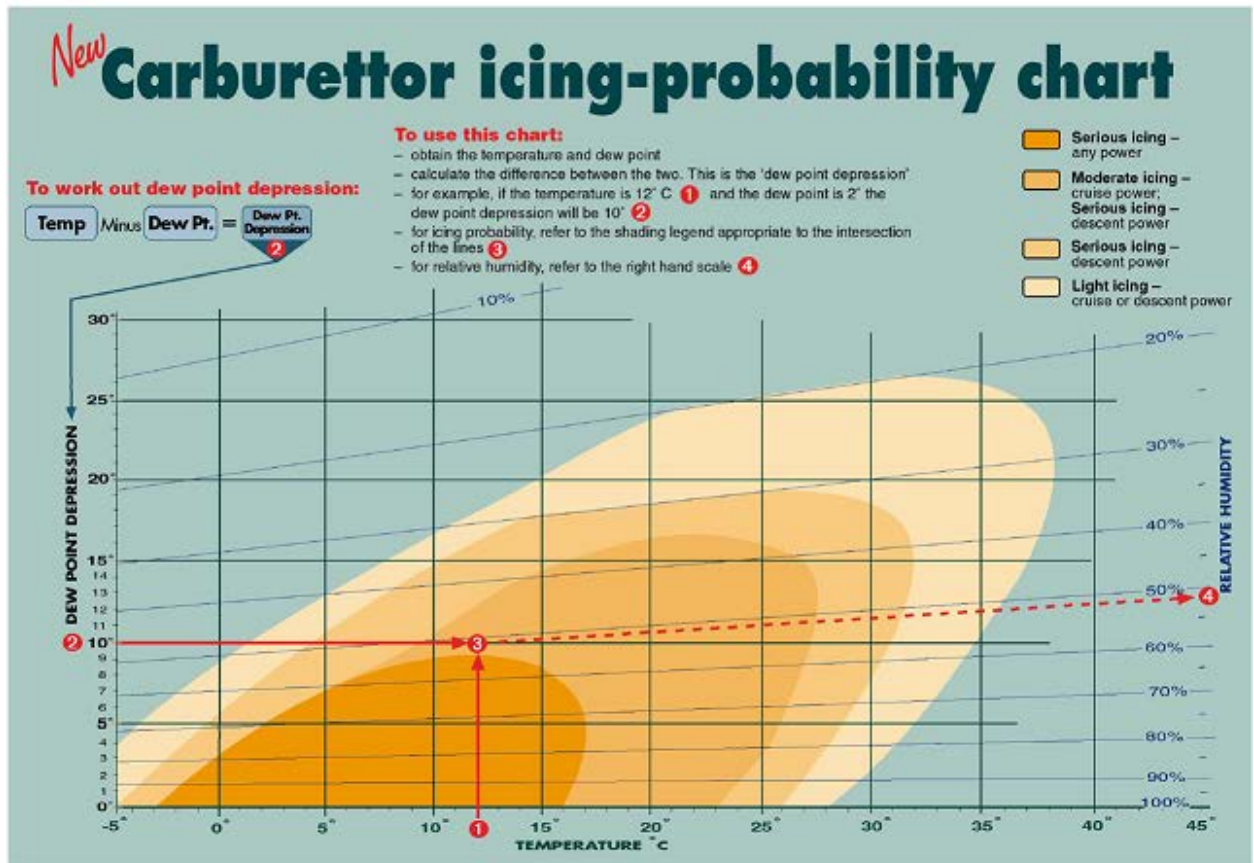
Source: Water Uptake and Weathering of Ethanol-Gasoline Blends in Humid Environments, NREL TSA 14-665 for the Renewable Fuels Association, Earl D. Christensen and Robert L. McCormick, National Renewable Energy Laboratory

- The FAA has written an SAIB on the carburetor icing, CE-09-35:



SAIB CE-09-35 -
Carb Icing.pdf

- Based upon the temperature and dewpoint at the time of the accident, the engine was in the “Serious Icing (descent power)” and “Moderate icing (cruise power)” range.



Source: https://www.casa.gov.au/sites/g/files/net351/f/_assets/.../carburettor_icing_chart.pdf

- Transport Canada has published TP 10737, "The Use of Automotive Gas (Mogas) in Aviation." Chapter 3.2 "Carburetor Icing," contains important guidance for pilots operating aircraft with Mogas instead of Avgas.

Mogas is generally higher in volatility than Avgas. Mogas will thus absorb more heat from the mixing air when vapourizing, resulting in ice accumulation at higher ambient temperatures. THE LIKELIHOOD OF CARB ICING WHILE FLYING ON MOGAS IS HIGHER.

Although the severity of the carb icing and the methods to deal with it are similar for both Avgas and Mogas, its ONSET is likely to occur at HIGHER AMBIENT TEMPERATURES and at LOWER HUMIDITY with Mogas. In other words, conditions under which a pilot may feel there is only a slight risk for carb icing on Avgas may in fact be ideal for the formation of ice while using more volatile Mogas. This will result in the need to select "carb heat on" in less severe icing conditions and for a longer duration while using Mogas.



Transport Canada
MOGAS Guidance.p



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