



**NTSB**

# ***SAFETY ALERT***

National Transportation Safety Board



## **Engine Power Loss Due to Carburetor Icing**



### ***Recognizing weather conditions and applying simple procedures can prevent avoidable accidents***

#### ***The problem***

- According to NTSB aircraft accident data, from 2000 to 2011, carburetor icing was a cause or factor in about 250 accidents. On average, carburetor icing causes or contributes to two fatal accidents per year.<sup>1</sup>
- Accident evidence shows that some pilots:
  - Do not recognize weather conditions favorable to carburetor icing and inaccurately believe that carburetor icing is only a cold- or wet-weather problem.
  - Have not used the carburetor heat according to the aircraft's approved procedures to prevent carburetor ice formation.
  - Do not recognize and promptly act upon the signs of carburetor icing.

#### ***Related accidents***

- A pilot ditched a Varga Aircraft Corporation 2150A airplane into a lake following a loss of engine power. The pilot sustained minor blunt force injuries but then became hypothermic and drowned. The throttle was found full open, the mixture control was found full rich, and the carburetor heat was found in the cold position. During a postaccident test run of the engine, it started and ran, and no preimpact abnormalities were found. The temperature and dew point at the time of the accident were conducive to serious icing at cruise power settings. Therefore, it is likely that the pilot did not apply carburetor heat during the approach to the airport, and the airplane experienced a loss of engine power due to carburetor ice. (NTSB accident number [CEN12FA152](#))
- A pilot was flying an American Champion 7GCBC airplane in the traffic pattern when the airplane lost engine power. During the ensuing attempted forced landing, the pilot failed to maintain a safe flying airspeed, which resulted in an inadvertent stall and crash and the pilot dying. Analysis of GPS and engine monitoring system data revealed that, as the airplane was rolling out on the downwind leg, the throttle was reduced, and the airplane then continued on the downwind leg for at least 14 seconds. As the airplane turned to the base leg, the first attempt to actuate the throttle occurred along with an increase in manifold pressure, which continued to fluctuate as the airplane flew straight toward the open field. An examination of the engine and airframe revealed no anomalies that would

<sup>1</sup> The data are derived from the NTSB aviation accident database and represent accidents in which carburetor icing was cited as a cause or factor in accidents involving aircraft equipped with a functional carburetor heat control. Numerous other accidents involved a loss of engine power for undetermined reasons during a timeframe in which conditions were favorable for the formation of carburetor icing; however, the investigations did not conclude that carburetor icing caused the power loss.

have precluded normal engine operation. A carburetor icing chart showed that the weather conditions were conducive for moderate icing at cruise power or serious icing at descent power. Therefore, data indicate that, as with the accident described above, it is likely that the pilot did not apply carburetor heat during the flight, and the airplane experienced a loss of engine power due to carburetor ice. ([DFW08FA228](#))

### ***What can pilots do?***

- Check the temperature and dew point for your flight to determine whether the conditions are favorable for carburetor icing. Remember, serious carburetor icing can occur in **ambient temperatures as high as 90° F** or in **relative humidity conditions as low as 35 percent** at glide power.
- Refer to your approved aircraft flight manual or operating handbook to ensure that you are using carburetor heat according to the approved procedures and properly perform the following actions:
  - Check the functionality of the carburetor heat before your flight.
  - Use carburetor heat to prevent the formation of carburetor ice when operating in conditions and at power settings in which carburetor icing is probable. Remember, ground idling or taxiing time can allow carburetor ice to accumulate before takeoff.
  - Immediately apply carburetor heat at the first sign of carburetor icing, which typically includes a drop in rpm or manifold pressure (depending upon how your airplane is equipped). Engine roughness may follow.
- Consider installing a carburetor temperature gauge, if available.
- Remember that aircraft engines that run on automotive gas may be more susceptible to carburetor icing than engines that run on Avgas.

### ***Interested in more information?***

The reports for the accidents referenced in this safety alert are accessible by NTSB accident number from the NTSB's [Aviation Accident Database & Synopses](#) web page at [www.nts.gov/aviationquery/index.aspx](http://www.nts.gov/aviationquery/index.aspx). Each accident's public docket is accessible from the NTSB's [Docket Management System](#) web page at <http://dms.nts.gov/pubdms/>.

Federal Aviation Administration (FAA) special airworthiness information bulletin (SAIB) CE-09-35, "[Carburetor Icing Prevention](#)," contains a graph that shows the probability of carburetor icing for glide and cruise power settings at various temperature and relative humidity conditions and can be accessed at [www.faa.gov/aircraft/safety/alerts/saib/](http://www.faa.gov/aircraft/safety/alerts/saib/). Also, see [Advisory Circular 20-113](#), "Pilot Precautions and Procedures to be Taken in Preventing Aircraft Reciprocating Engine Induction System and Fuel System Icing Problems," which provides information pertaining to aircraft engine induction system icing and the use of fuel additives to reduce the hazards of aircraft operation that may result from the presence of water and ice in aviation gasoline and aircraft fuel systems and can be accessed at [www.faa.gov/regulations\\_policies/advisory\\_circulars](http://www.faa.gov/regulations_policies/advisory_circulars).

TP 10737, "[The Use of Automotive Gas \(Mogas\) in Aviation](#)," Chapter 3.2 "Carburetor Icing," was published by Transport Canada and contains important guidance for pilots operating aircraft with Mogas instead of Avgas.

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