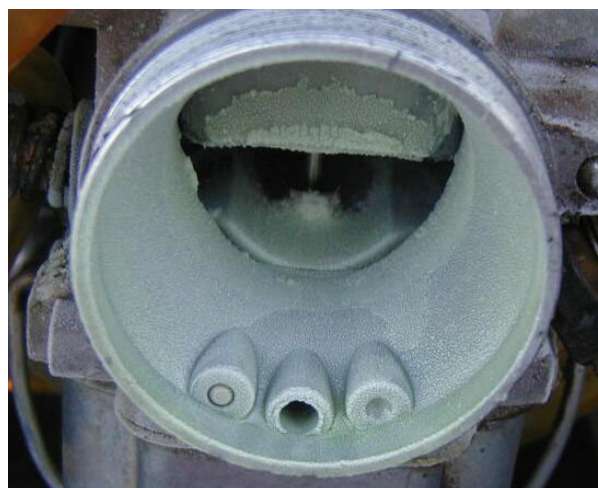
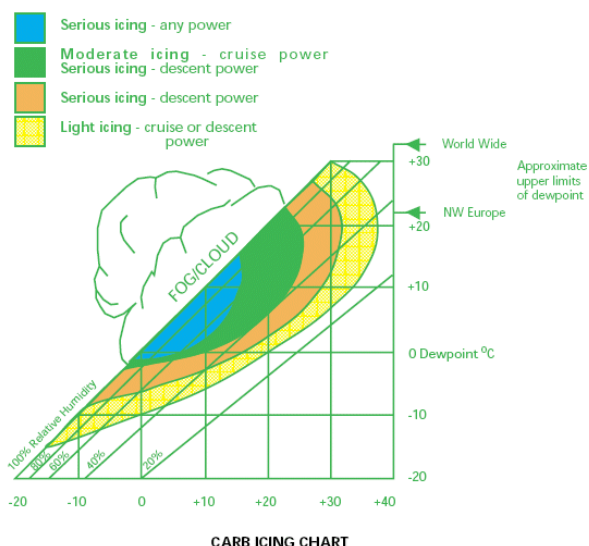


# ST Aviation Ltd

## ICE ELIMINATOR™

Carburettor icing is one of the most common causes of engine failure on normally aspirated piston aircraft engines. Traditional hot air systems work well to melt off ice forming around the butterfly valve and induction venturi, but require the pilot to use the control regularly, and in particular prior to take off and during reduced power descents. These traditional systems, however, use an intense heat source (ie the exhaust system), and are rather like using a hammer to crack a nut.

Alternative carb ice systems do not always provide 100% efficacy and therefore can render the pilot helpless in heavy icing conditions.



Carb slide frozen open

CARB ICING CHART  
(from [CAA document SSL14](#) click to enlarge)

The above table shows that carburettor ice can occur in certain conditions at ambient temperatures up to 37°C and are at worst between 0 and 15°C, particularly in humid conditions.

All too often pilots forget to use carburettor heat at these critical phases or don't use it often enough during the cruise. Ice builds up and if the gradual power loss is not noticed in time the result is an in flight engine failure. In addition, a pilot may forget to turn the carb ice off which will result in reduced power output during take-off or go-around. There has been increasing pressure from the UK Safety Authorities to develop a system which eliminates the possibility of pilot error; in other words an ice elimination system which is "always on".

At ST Aviation Services Ltd we have been researching this subject for some time, and with over 500 Jabiru engines in service in the UK have been able to gather information on the various methods in use and their effectiveness. We looked at oil heating systems, but data gathered told us that these systems were their least effectiveness at the most critical times for carb icing. Prior to take off for example, it is difficult to get the oil temperature above 50°C. During descent the oil cools rapidly and there have been several cases of engine stoppage during this phase of the flight. The problem is more pronounced on open installations. Some cowled installations take their induction air from within the cowlings and try to rely on this warmer air to avoid icing, but on the ground and in the descent this approach has again not always been proven to be fully effective.

The CAA have been active on this front, and produce their own [AIC leaflet](#). We decided to develop a lightweight electrical heater that would deliver heat exactly where it is needed; the Butterfly valve and Venturi area. By providing a

point heat source in this critical area, ice formation is greatly reduced or eliminated. The system is designed to be ALWAYS ON, therefore eliminating the need for the pilot to remember to select heat on. There are two electrical elements within the unit, each generating 30 watts. It is possible to switch these independently if desired, where for example on a cowl'd installation you could use both for take off and descent/ landing and one for the cruise. Or just leave both on giving maximum protection all the time.



Ice Eliminator installed

The Ice Eliminator system is supplied complete with the dual heater element, switch, wire, fuse holder and fuse, thread tap, fixing screws, heat paste and installation instructions.

The system can be used in conjunction with existing methods, to give additional protection, or be used as the primary method of protection. During ground trials on a damp day on wet grass a test engine was run at 1000rpm and after three minutes considerable ice was visible on the outside of the carburettor and the engine lost power and stopped. With the Ice Eliminator switched on automatically via the master switch, no ice formed on the carburettor and the engine ran without problems. Further trials were carried out to run the engine un-protected, and when ice was visible and the engine started to lose power, the Ice Eliminator was selected on and the engine continued to run. Within three minutes the visible ice was gone and the engine power restored.

### **Cold Starting Benefits**

Another major benefit of the system is by pre heating the carburettor in cold weather, this will help fuel atomise in cold weather and improve cold starting performance. This will be particularly beneficial when temperatures are below 0°C.

### **Features**

- Can be used on Jabiru and Rotax Microlight engines (but check clearance)
- Always On protection generates heat exactly where it is needed
- Switchable 12v 30/ 60 watt (2.3 & 4.6 Amps) dual element
- Dual elements give redundant protection
- Complete system ready to fit without removal of carburettor
- Stand alone system or in conjunction with existing systems
- Cold start pre-heating in extreme conditions
- Heater unit weight only 70 grammes

Negligible power loss as unit heats the carburettor not the air