

AIRWORTHINESS ADVICE NOTICE

TYPE AFFECTED: All jet powered sailplanes using diesel fuel.

SUBJECT: Variation of Australian diesel fuel with location and season.

DEFINITIONS: Cloud Point: The temperature at which wax is first seen to crystallize in the fuel

Cold Filter Plugging Point (CFPP): The CFPP is the lowest temperature at which fuel will still flow through a standard filter. Typically the CFPP is 3 degrees Celsius below the diesel cloud point.

Pour Point: The temperature at which the fuel freezes. Typically the pour point is 3 to 6 degrees Celsius below the diesel cloud point.

BACKGROUND: Diesel is a fuel intended for automotive use. The fuel contents are adjusted to suit the climate of the area at the time of purchase. Whilst approved for use in some jet engines, the variation with location and season may cause starting or running issues.

All diesel fuels contain wax. Normally the wax is a liquid in solution in the fuel. It is an important component because it gives the fuel a good cetane value for automotive engines. However, when a fuel gets cold the wax will start to crystallize at the fuel cloud point temperature. These wax crystals can block engine fuel filters or small orifices.

If the temperature is sufficiently low to crystallize a lot of wax (CFPP) the filter or orifices will become completely blocked. Because removing the wax during refining reduces cetane the amount of wax in diesel is varied by the season and the location. Hence the fuel cloud point and CFPP will vary by season and location.

An example of this variation in fuel cloud point is below at Table 1 (source: BP, 1 May 2015).

SIGNED:

Anthony Smith
DEPUTY CHAIR AIRWORTHINESS DEPARTMENT 2

For and on behalf of:

**THE GLIDING FEDERATION
OF AUSTRALIA**

SUPPLY LOCATION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Darwin	15	15	12	9	8	8	8	10	14	15	15	15
Gove												
Adelaide	8	6	4	2	1	1	1	2	4	5	6	9
Brisbane	11	7	3	0	-1	-1	-1	0	2	7	9	13
Gladstone	15	12	7	4	2	2	2	4	7	12	15	15
Mackay												
Townsville	15	15	11	7	6	6	6	8	11	15	15	15
Cairns	15	15	12	7	7	7	7	9	12	15	15	15
Kewdale												
Nth Fremantle	8	6	0	0	0	0	0	0	3	5	8	8
Kalgoorlie												
Albany	8	6	0	0	0	0	0	0	3	5	8	8
Esperance												
Geraldton	8	6	0	0	0	0	0	0	3	5	8	8
Broome	15	15	12	9	8	8	8	10	14	15	15	15
Wyndham												
Port Hedland	15	15	9	6	5	5	5	7	11	15	15	15
Dampier												
NW Cape												
Melbourne	9	6	3	1	0	0	0	1	2	4	6	8
Geelong	9	6	3	1	0	0	0	1	2	4	6	8
Sydney	9	5	2	0	-1	-1	-1	0	2	5	7	9
Newcastle												
Tasmania	3	1	-1	-2	-3	-3	-3	-3	-1	0	2	3

Table 1: Fuel Cloud Point Variation

ADVICE:

Flight at altitude will cool the diesel fuel in the fuel tank. This mass of fuel when cold soaked will take time to warm up and the fuel may still be at or below the CFPP despite the aircraft having descended to lower altitudes. This may cause poor fuel flow in the advent of an attempted engine start.

Similarly, diesel fuel purchased in summer may not be well suited for use in winter. It will be at or below the CFPP at a lower altitude and cause poor fuel flow.

Whilst some jet engine manufactures allow the use of diesel fuel, jet fuel is the preferred fuel as it is made to a constant standard, is intended for use at cold temperatures and does not vary with season and location. It is recommended that owners of jet powered sailplanes using diesel fuel consider the implications of Table 1 for the conditions in which they operate. Operators should seek advice from the engine manufacturer with respect to the use of kerosene or other additives to lower the CFPP and pour point of diesel fuel.