Power Consumption of a 73 Litre Eutectic Fridge or Freezer

Eutectic refrigeration is often used in fishing vessels. A eutectic fridge has a `cold sink´ of very cold fluid to help it to maintain its cold temperature once power to run the fridge compressor is switched off or unavailable. The basic principle is that when the engine of your boat or vehicle is running (and therefore generating power), you run your fridge so that the eutectic fluid goes below 0℃. This then keeps your fridge cold for a further 24-48 hours (while your engine is off). The 73 litre eutectic fridge- freezer that we sell has this fluid inside the walls where one would expect to find normal fridge insulation.

Another application is for camping and touring. If you drive your vehicle for at least 4-5 hours every 2 days, you can use your fridge without any solar or other charging source.

The advantage of a eutectic fridge in a solar set-up is that you can time the fridge to come on in day light hours only (when your solar panels are generating power). This lowers the system voltage a bit and helps to get a bit more amperage from your panels. More importantly, it helps reduce the battery inefficiency that results from storing power in your batteries during the day to run the fridge at night! And the last bonus is that because the fridge does not need power to stay cold for 1-2 days you may be able to use a smaller battery bank!

One of our staff ran and monitored his eutectic fridge power consumption for a whole year in the Nimbin area. This is a sub- tropical area of Australia with summer day temperatures around 32C and winter around 20C.

RAINBOW POWER COMPANY LTD

A.B.N. 74 003 323 420

1 Alternative Way Nimbin NSW 2480 AUSTRALIA
Phone : (02) 6689 1430 Fax : (02) 6689 1109
International : Phone : +61 2 6689 1088 Fax : +61 2 6689 1109
sales@rpc.com.au www.rpc.com.au

73 Litre Eutectic Auto Fridge Power Consumption - A/hr @ 12V
The monthly averages were:

AUG... 11.1
SEP... 13.7
OCT... 14.8
NOV... 15.5
DEC... 18.4
JAN... 19.3
FEB... 19.9
MAR... 18.2
APR... 12.5
MAY... 12.2
JUN... 8.29
JULY... 9.82

In our shop in Nimbin, we ran 4 tests to establish how much power the eutectic fridge uses in different situations.

1) The first test was conducted by bringing 4 litres of water at room temperature 23 C down to 3 C. The cold water was replaced with another room temperature 4-litre bottle of water daily. The power consumption was then measured with a data logger, and the battery voltage was regulated at 12.8 volts throughout the test. The average number of amp hours required daily by the eutectic fridge was only 13.2 Ah.

2) Considered by many to be a very small load, the 4 litres of water was replaced with a carton of beer (24 bottles each 375 ml). The amount of energy required to bring the beer to 3 C from an ambient temperature of 23 C was then logged. The beer was then left in the eutectic fridge for the remaining 3 days of the test to establish how much energy was required to keep it at this temperature. The average daily power consumption was only 12 Ah.

3) As the eutectic fridge can be used as a freezer, the third test required the freezing of 10 litres of water. Ten 1-litre bottles of water were added with a starting temperature of 23 degrees. The eutectic fridge took around 12 hours to bring the water to freezing point. A total of 96 Ah was used over the first day to bring the ten bottles down to -9C. To hold the ice at this temperature used less power over the next 3 days; 80, 65 and finally 43 Ah were required over the next three days.

4) The final test was to measure the eutectic fridge´s ability to maintain a safe cold temperature after being disconnected from the power supply and allowed to act as an "esky". The gradual rise in temperature was monitored for a further 3 days. Due to the eutectic layer, the eutectic fridge took 3 days to rise above 10C.

This performance makes the eutectic fridge appropriate for freezing and transporting goods such as fish in areas where power supply is limited or intermittent from a vehicle engine or other power supply.