

Bulk milk tank ice bank controllers

Introduction

Bulk milk tanks with ice bank cooling require a minimum thickness of ice to be built up before milking begins. Ice bank controllers are used to ensure that as much of the ice as possible is formed using low cost night rate electricity.

An ice bank controller delays the ice building in the milk tank until the start of the Economy 7 tariff cheap night period. Back-up ice probes allow the tank to build ice during the day period if the ice thickness falls below a preset minimum. More sophisticated controllers look at how long the compressor ran the day before and adjust the compressor running time for the following day.

Actual compressor running times at the NAC Dairy Unit and at a local farm have been monitored and the figure below shows a typical summer's day operation with a controller.

The objective was to see how long the compressor (without the use of an ice bank controller) ran during the night rate period of the E7 tariff. Taking the local dairy farm as being more typical in relation to actual milking times, it showed that on average the compressor ran for 27% of the 7 hour period in the summer. It was calculated that it would run for 14% in the winter.

This represents 1.9 hours and 1 hour respectively. If an average over the year of 1.5 hours / night is assumed, then 5.5 hours can be transferred into the E7 night rate period by using an ice bank controller.

Table 1 and Figure 2 give an indication of the annual savings that can be made by fitting an ice bank controller. The cost of supplying and fitting a controller starts at around £200 so the most attractive savings apply to the larger tanks.

Figure 1 - Operation of a bulk tank compressor without an E7 controller

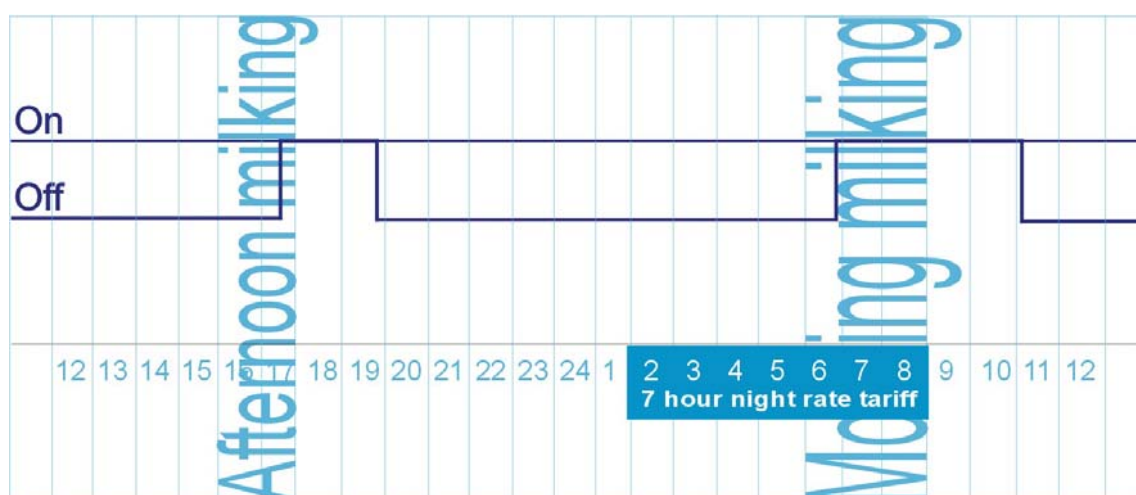


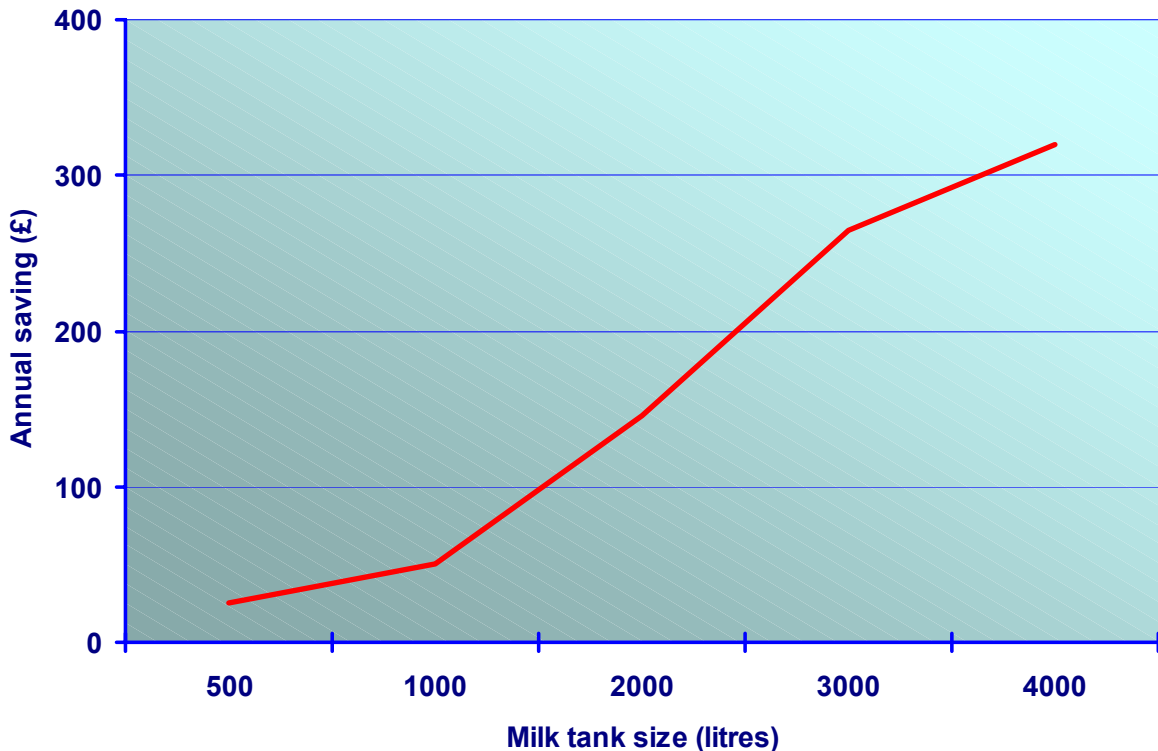


Table 1

Tank size		Compressor size	Savings per hour per annum*	Transfer hours	Savings per annum*
<i>gallons</i>	<i>litres</i>	<i>kW</i>	<i>£</i>	<i>hours</i>	<i>£</i>
100	454	0.25	5.27	5.5	29
300	1362	0.75	15.82	5.5	87
500	2270	1.50	31.64	5.5	174
750	3405	2.80	59.09	5.5	325
945	4290	3.00	63.27	5.5	348

*Based on Economy 7 type tariff Day units - 8.49p/kWh
 Night units - 2.7p/kWh

Figure 2 - Savings by fitting a bulk milk tank controller



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