

Dairy Energy Calculators



Calculating Energy use and
Energy Conservation Measure

Savings

Northeast Agriculture Technology
Corporation

Vacuum Pumps

- Calculating Vacuum Pump Capacity
- Vac Pump Capacity (cfm) =
 - base cfm + 2.0 cfm/milking unit +
 - 1.2 cfm/milking unit safety factor
- base cfm = 35

Vacuum Pump Horsepower

- Calculating Horsepower requirement for a vacuum system

$$\text{vac. pump Hp.} = \frac{\text{vac. pump capacity (cfm)}}{10 \text{ cfm/Hp}}$$

Energy Savings of an ASD on a Vacuum Pump

- Savings calculator for a vacuum pump
ASD

Annual savings (kWh) =

$$[\text{Hp of vac pump} - (0.25 \times \text{no. of milking units})] \times (0.9 \times \text{hrs of operation/day}) \times 365 \text{ days/yr}$$

Milk Pre-Cooler

- Calculator to determine savings of well water pre-coolers
- Annual savings (kWh/yr) =
 - 0.3 kWh saved/cwt of milk x cwt of milk cooled/yr

Savings of a Precooler with an ASD on the Milk Pump

- Estimated annual energy savings using a well water precooler with an ASD on the milk pump

Annual savings (kWh/yr) =
0.45 kWh saved/cwt of milk cooled x
cwt of milk cooled/yr

Lighting Calculators

- Calculating required lamp watts

Lamp watts required = $\frac{\text{required lumens/sq ft}}{\text{coefficient of util.}}$

X watts x sq ft of lighted area X
rated lamp lumens

1.20 light degradation factor x 1.13 ballast factor

Lighting Calculators

- Calculator to determine how many light fixtures are required:

$$\text{No. of light fixtures} = \frac{\text{lamp watts required}}{\text{watts/fixture}}$$

Livestock Fountains

- Calculator to determine annual energy use by a heated livestock fountain:

1) Inside a shelter

$$\text{Annual kWh} = 3.5 \text{ kWh/cow/yr}$$

2) Outside

$$\text{Annual kWh} = 5 \text{ kWh/cow/yr}$$

High Efficiency Ventilation fan Energy Savings

- Calculator to determine savings from installing higher efficiency fan:

Hi efficiency fan savings (kWh/yr) =

$$\frac{\text{Total cfm old}}{\text{cfm/watt old}} - \frac{\text{total cfm new} \times \text{1 kW}}{\text{cfm/watt new} \quad 1000 \text{ watts}}$$

X hours fans operate/year