

Calculators

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Chapter 1 – Milk Harvest Calculators

The following calculators can be used to estimate the required vacuum pump capacity and horsepower. The calculators should only be used as a guide, and should not be used as final sizing criteria, since there may be other sizing factors not considered, such as additional capacity for milk meters, vacuum operated takeoffs, etc. These calculators can also help you assess whether your existing vacuum system is grossly oversized.

Calculator to determine vacuum pump capacity and vacuum pump horsepower:

Directions:

1. Double click on number in **yellow box** to highlight.
2. Type in new number of milking units
3. **DO NOT HIT “ENTER”.**
4. Click on the **orange box** to highlight calculation.
5. Click Function Key **F9** to update calculation.
6. Repeat steps 4 & 5 to update calculation in 2nd orange box.

Milking Units:	8
Vacuum Pump Capacity (cfm) =	61
Vacuum Pump Horsepower (Hp) =	6

Calculator to estimate the annual savings of VSD on a vacuum pump:

Directions:

1. Double click on number in the 1st yellow box to highlight.
2. Type in Hp of vacuum pump.
3. **DO NOT HIT "ENTER"**.
4. Repeat steps 1 – 3 to insert the number of milking units and the hours of operation in the next 2 boxes.
5. Click on the orange box to highlight calculation.
6. Click Function Key **F9** to update calculation.

Hp of Vacuum Pump :	7.5
No. of Milking Units:	8
Hours of Operation:	6
Estimated Annual Savings (kWh) =	10,841

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Chapter 2 – Milk Cooling Calculators

The following calculator can be used to estimate the savings of well water precoolers and VFDs on receiver pumps. The calculator should only be used as a guide.

Calculator to show savings of well water precoolers and VFDs on receiver pumps:

Directions:

1. Double click on number in **yellow box** to highlight.
2. Type in new CWT.
3. **DO NOT HIT “ENTER”**.
4. Click on the **orange box**.
5. Press Function Key **F9** to update calculation.
6. Repeat steps 4 & 5 to update calculation in 2nd orange box.

Cwt of milk cooled/yr:	200100
Estimated annual savings of well water precoolers (kWh/yr) =	60,030
Estimated annual energy savings of well water precooler <i>PLUS</i> a VFD on receiver pump =	90,045

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Chapter 3 – Lighting Calculators

The following calculators can be used to determine lamp watts required to illuminate a specific size room to a specific level of footcandles or lumens per square foot, as well as the number of light fixtures required. The annual energy consumption (kWh) is also calculated. The calculators should only be used as a guide.

Calculators to determine lamp watts and number of light fixtures required, and annual energy consumption:

Directions:

1. Double click on number in **yellow box** to highlight.
2. Referring to Table 3-1, type in new required lumens/sq ft.
3. **DO NOT HIT “ENTER”**.
4. Repeat steps 1-3 for the remaining information in the next 4 boxes (rated lamp lumens, sq ft of lighted area, watts/fixture, and no. of hours lights are on)
5. Click on the first **orange box**.
6. Press Function Key **F9** to update calculation.
7. Repeat steps 4 & 5 to update calculations in the 2nd and 3rd orange boxes.

1 footcandle = 1 lumen/sq ft

Required lumens/sq ft (Table 3-1):	50
Rated lamp lumens (from Table 3-1):	94
Square footage of lighted area:	250
Watts/fixture:	250
No. of hours lights are on:	18
Lamp watts Required =	380
Number of Light Fixtures Required =	2
Annual Energy Consumption (kWh) =	3,285

Calculator to determine lighting conversion savings:

Total existing lighting watts:	800
% savings of new lights (From Table 3-10):	70
No. of hours lights are on:	18
Savings to convert (kWh/yr) =	3,679

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Chapter 4 – Air Circulation & Ventilation Calculators

FAN EFFICIENCY CALCULATOR

The following calculator can be used to estimate the annual energy savings of installing higher efficiency fans. The calculator should only be used as a guide.

Calculator to estimate the annual energy savings of installing higher efficiency fans:

Directions:

1. Double click on number in **yellow box** to highlight.
2. Type in the Total cfm (old).
3. **DO NOT HIT “ENTER”**.
4. Repeat steps 1-3 for the remaining information in the next 4 boxes (Cfm/watt old, Total cfm new, Cfm/watt new, and hours fans operate).
5. Click on the **orange box**.
6. Press Function Key **F9** to update calculation.

Total cfm old:	250000
Cfm/watt old:	18
Total cfm new:	250000
Cfm/watt new:	21
Hours fans operate/yr:	4800
Savings of Higher Efficiency Fans (kWh/yr) =	9,524

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Chapter 8: General Information Calculator

The following calculator can be used to estimate the annual energy savings using a more efficient motor. The calculator should only be used as a guide.

Calculator to estimate the annual energy savings:

Directions:

1. Double click on number in 1st **yellow box** to highlight.
2. Type in the new horsepower
3. **DO NOT HIT ENTER.**
4. Repeat steps 1-3 for the remaining information in the next 5 boxes (load factor, annual operating hrs, avg. energy costs, standard and energy efficient motor ratings)
5. Click on the number in the **orange box**.
6. Press Function Key **F9** to update calculation.

Motor rated horsepower (hp):	5
Load factor (% of full load):	100
Annual operating hours:	4000
Average energy costs (\$/kWh):	0.12
Standard motor efficiency rating, %:	85
Energy-efficient motor efficiency rating, %:	86
Annual Energy Savings =	\$ 24

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