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Energy Savings Calculation Reference Sheet

Fan Replacement Energy Savings Calculations:

Assumptions:

- Shaded Pole Motor (1/15th HP, 115V): 154W
- EC Motor (High Speed) 1/15th HP, 115V: 50W
- EC Motor (Low Speed) 1/15th HP, 115V: 9W
- Shaded Pole Motor (1/15th HP, 230V): 242W
- EC Motor (High Speed) 1/15th HP, 230V: 18W
- EC Motor (Low Speed) 1/15th HP, 230V: 3W
- Shaded Pole Motor (1/47th HP, 115V): 72W
- EC Motor (High Speed) 1/47th HP, 115V: 47W
- EC Motor (Low Speed) 1/47th HP, 115V: 5W
- Shaded Pole Motor (1/47th HP, 230V): 64W
- EC Motor (High Speed) 1/47th HP, 230V: 42W
- EC Motor (Low Speed) 1/47th HP, 230V: 4.4W
- EC Motor at High Speed (Cooler): 35% of the Time
- EC Motor at Low Speed (Cooler): 65% of the Time
- EC Motor at High Speed (Freezer): 40% of the Time
- EC Motor at Low Speed (Freezer): 60% of the Time

- Shaded Pole Motor Energy Usage (kWh) 115V
  - (# of motors) x ((154W x 24hrs x 365 days)/1,000)
  - 6 x (1,349,040/1,000)
  - 8,094.24 kWh
- EC Motor Energy Usage (kWh) 115V
  - (# of motors) x (((50W x 0.35) + (9W x 0.65)) x 24 x 365)/1,000
  - 6 x ((17.5 + 5.85) x 8,760)/1,000
  - 6 x (23.35 x 8,760)/1,000
  - 6 x 204,546/1,000
  - 1,227.276 kWh
- Fan Motor Replacement Energy Savings
  - Shaded Pole Motor Usage – EC Motor Energy Usage
  - 8,094.24 – 1,227.28 = 6,866.96 kWh

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Defrost Controls Energy Savings Calculations:

Assumptions:

- Defrost Controls Energy Reduction: 45%
- Defrost Average Power Consumed: 1,100W per fan
- Daily Defrost Time (per Time Clock): 3 hrs. per day (4 times a Day for 45 minutes each time)
- (# of Fans) x (((1,100W x 3hr/day x 365) x 0.45)/1,000)
- 6 x ((1,204,500 x 0.45)/1,000)
- 6 x (542,025/1,000)
- 6 x 542.025 = 3,252.15 kWh

Heat (Load) Reduction:

Assumptions:

- 1W = 3.412 BTU/hr
- 6.2 EER Compressor Efficiency
- 10:1 Compressor: Condenser Ratio
- Average Power Consumed during Defrost: 1,100W per fan
- Daily Defrost Time, per Time Clock: 3 hours
- Defrost controls Energy Reduction: 45%

Fan Heat Load Reduction:

- (# of fans) x ((((Shaded pole Watts – Average ECM Watts) x 3.412)/6.2) x 24 x 365)/1,000
- 6 x ((((154 – 29.5) x 3.412) / 6.2) x 24 x 365) / 1,000
- 6 x (124.5 x 3.412 / 6.2 x 24 x 365 / 1,000)
- 3,601.16 kWh

Compressor Load Reduction:

- (Fan Heat Load Reduction) / (Compressor:Condenser Ratio)
- 3,601.16 / 10
- 360.116 kWh

Defrost Heat Load Reduction:

- (# of Motors) x (((1,100W x 3.412) / 6.2) + (((1,100W x 3.412) / 6.2) / 10))
- 6 x ((3,753.2 / 6.2) + ((3,753.2 / 6.2) / 10))
- 6 x (605.35 + 60.54)
- 6 x ((665.89 x 3 hr/day x 365 x 0.45) / 1,000)
- 6 x 328.12
- 1,968.70 kWh

Total Energy Save = **Fan Replacement Energy Reduction +**

Defrost Controls Energy Reduction +

Heat (Load) Reduction