

# Implementing Reduced Nocturnal Temperatures in Nurseries

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# Energy Savings Potential

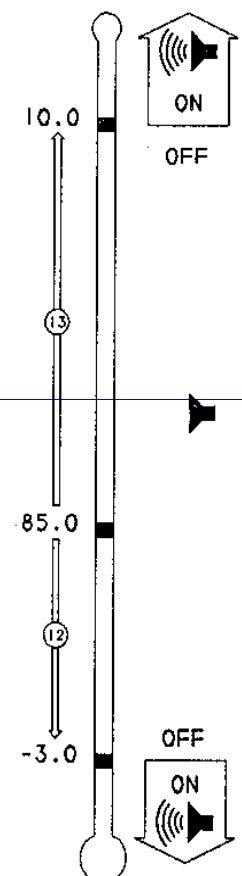
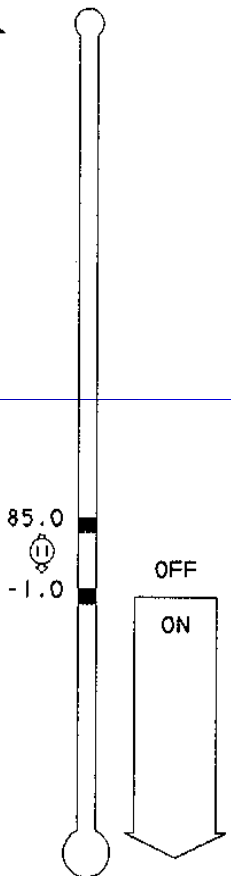
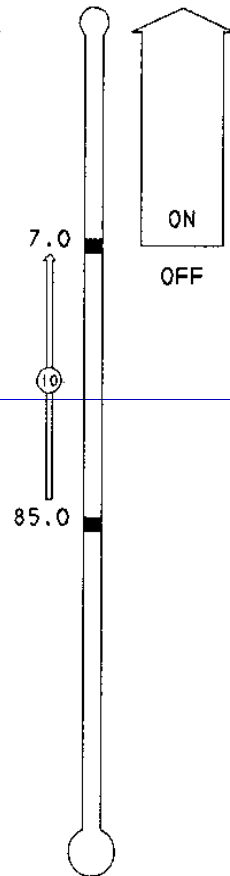
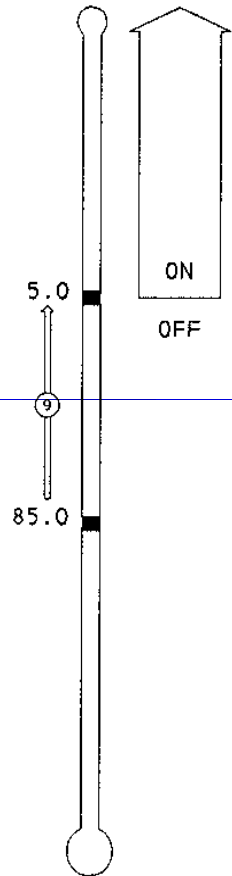
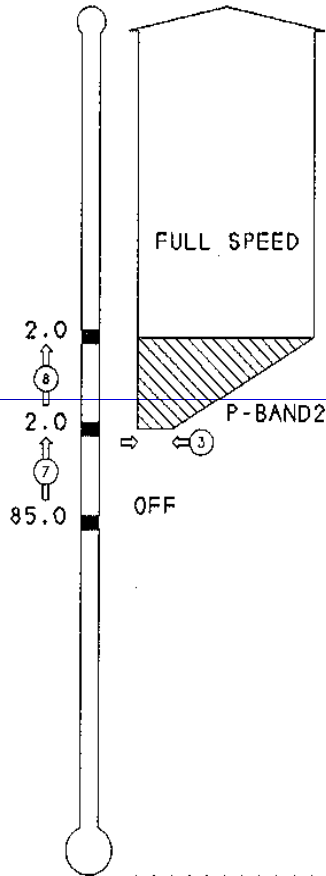
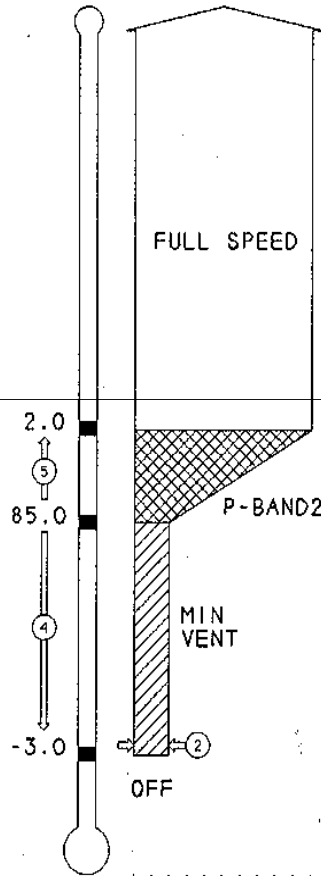
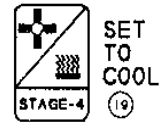
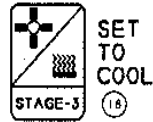
- Brumm and Shelton (1991)
- Measured savings
- Propane – 1.31 to 1.47 liters/pig
- Electricity – 0.21 to 0.57 kWh/pig
- Potential 2007 cost savings
- Propane - \$1.50/gal
- Electricity - 10¢/kWh
- Propane – \$0.52 to \$0.58/pig
- Electricity – about \$0.02 to \$0.06/pig
- Total range - \$0.50 to \$0.60 per pig

# Energy Savings Potential

- MU Trial
- Measured savings
- Natural gas – 0.052 MMBtu per pig
- Electricity – 0.23 kWh per pig
- Potential 2007 cost savings
- Natural Gas - \$7 per MMBtu
- Electricity - 10¢/kWh
- Natural gas - \$0.36 per pig
- Electricity - \$0.02 per pig
- Total - \$0.38 per pig

# Ventilation System Control

- Integrated controls and/or thermostats provide the control of ventilation equipment.
- Inside temperature is primary parameter to control ventilation equipment.
- Automatic control for RNT desired.
- Implementing RNT Management
  - Reduce heater on offset
  - Lower room set point temperature



FAN SPEED % 0 20 40 60 80 100

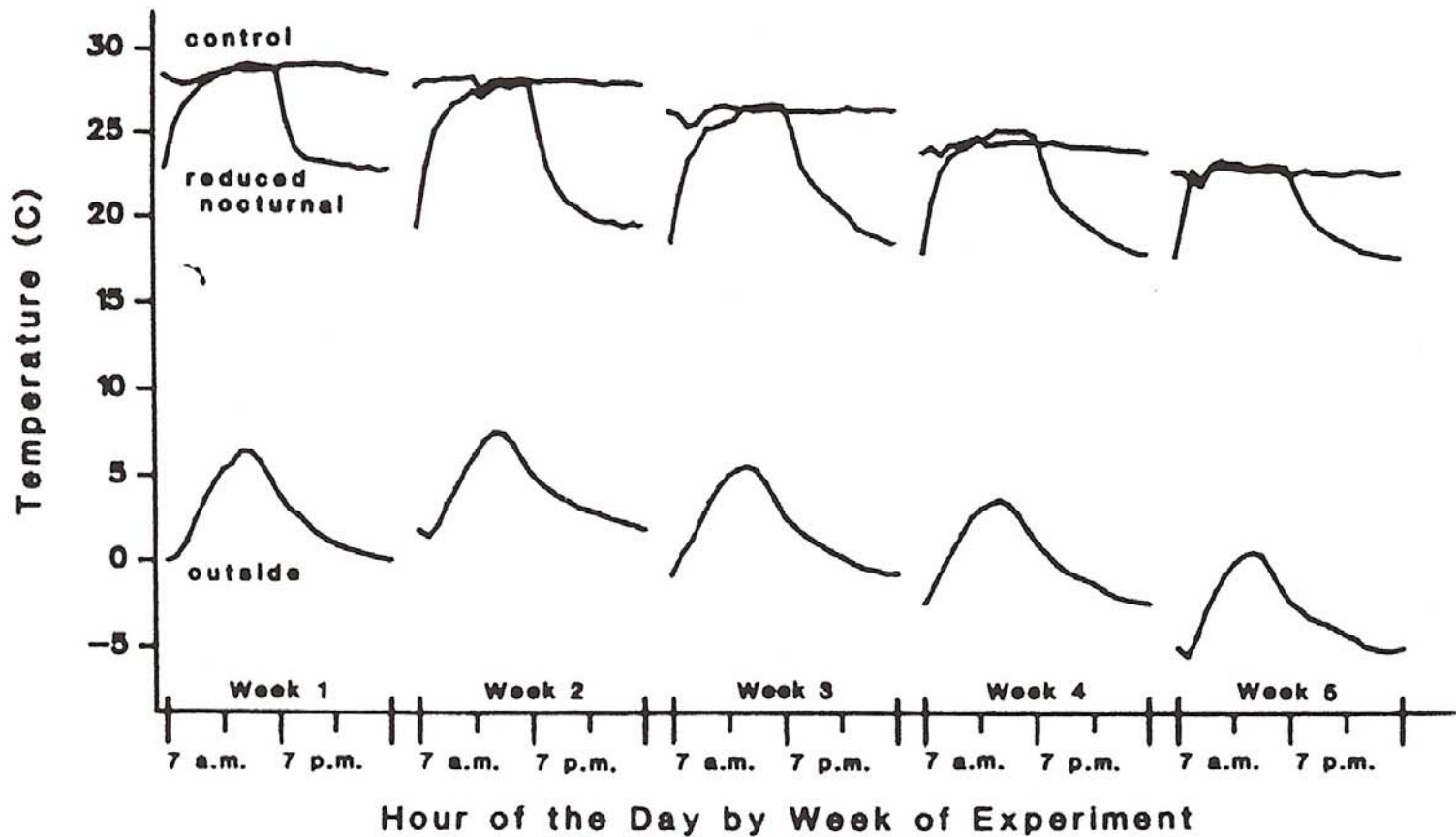
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EXAMPLE OF FACTORY PROGRAM "A"

102416.02

# Temperature Plots

Room & Outside Brumm & Shelton 1991



Heater "on" temperature lowered during night

# RNT Implementation by Lowering Room Set Point Temperature

- May not be “best” method
- Implementing Set Point Temp Options
  - Manually reset room set point temperature each evening and morning
  - Hang room temperature sensor at ceiling in evening and lower to pen level in morning
  - Some controllers may be “re-programmed” to include RNT room set point temperature management

# RNT Implementation by Lowering Heater “On” Temperature (Heater Offset)

- Probably “preferred” method
- Implementing Set Point Temp Options
  - Manually reset heater offset temperature each evening and morning
  - Install separate nighttime heat thermostat and 24 hour clock activated timer switch
  - Some controllers may be “reprogrammed” to include RNT heat management

# RNT Heater Control Using Integrated Controller and Separate Nighttime Thermostat

- Components Needed & Cost Estimate
  - Use existing integrated controller
  - Obtain additional thermostat with remote sensor capable of operating heater.
  - A SPDT timer switch with a 24 hour clock (i.e.. Grainger Item #2E026 – Timer Switch)
  - System cost about \$150 to \$200 per room

# RNT Implementation Summary

- RNT can reduce utility costs.
- RNT can be implemented with no capital costs when done manually.
- RNT can be implemented for automatic operation using heater “on” temperature reduction method.
- Current benefit analysis has not included pig performance differences.

**Questions??**