

# New Markets / Agriculture

Curtain-Sided Poultry Houses

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**Sunday, March 16, 2008**



# Curtain-Sided Poultry Houses

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- ❑ Most effective method of reducing cost is to convert it to a totally enclosed house
- ❑ Side wall curtains:
  - Have very low R-Value
  - Responsible for more than 25% of heat loss
  - The number one source of air leakage
- ❑ When totally enclosed, fuel savings are between 30 and 50%.
- ❑ Bird performance increases due to house temperature and air quality control



# Factors to consider when totally enclosing a curtain-sided house

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- ❑ Side wall construction
- ❑ Cost of various building supplies and insulation materials
- ❑ Amount of labor required
- ❑ House location

**NOTE:** Conventional methods of converting curtain-sided houses to solid side wall houses could cost two to three times more than the cost of using spray polyurethane foam insulation.

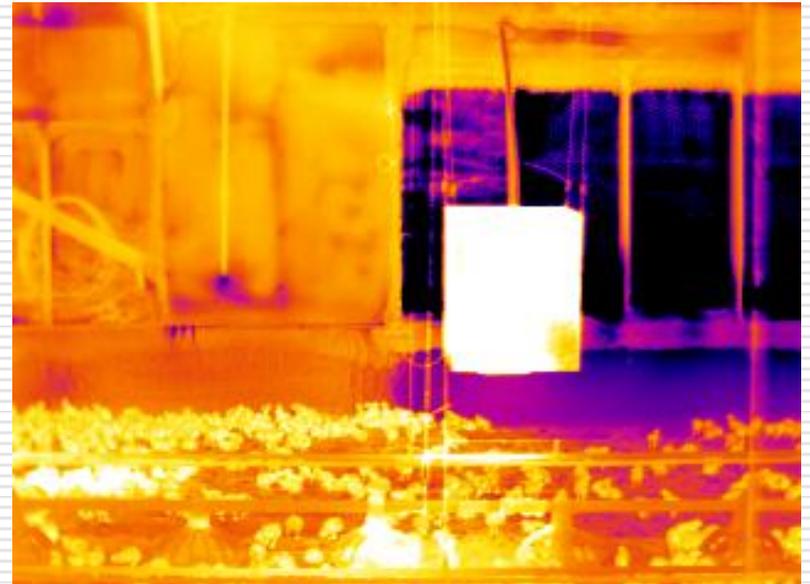
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# Advantages of Polyurethane Insulation

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**Curtain sprayed with polyurethane insulation**



**Side wall sprayed with polyurethane insulation next to un-insulated tunnel curtain**

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# **Advantages of Polyurethane Insulation**

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# Using Closed Cell Polyurethane Foam Insulation to Totally Enclose Curtain-Sided Houses

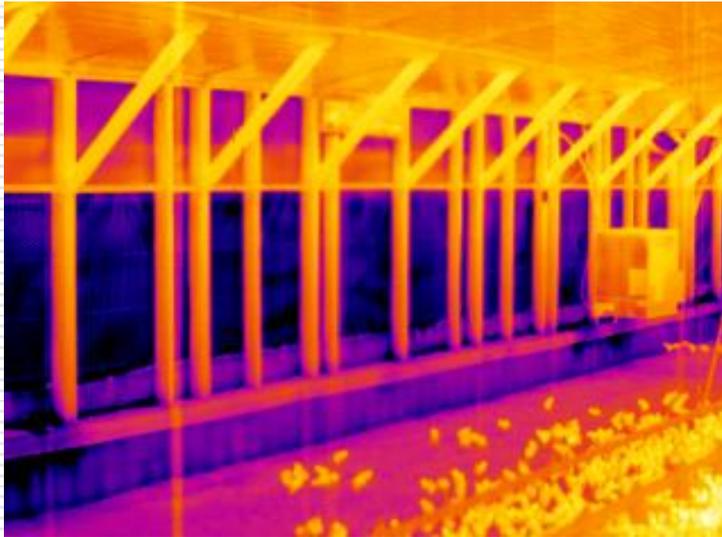
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- ❑ Side wall curtains are nailed closed
  - ❑ Exhaust fans turned on to create high static pressure pulling curtains tight against side wall
  - ❑ Foam quickly expands when applied to side wall curtains
  - ❑ 1" to 1 ½" of Polyurethane Insulation provides an R-value of between 5 and 7
  - ❑ Air leakage is virtually eliminated
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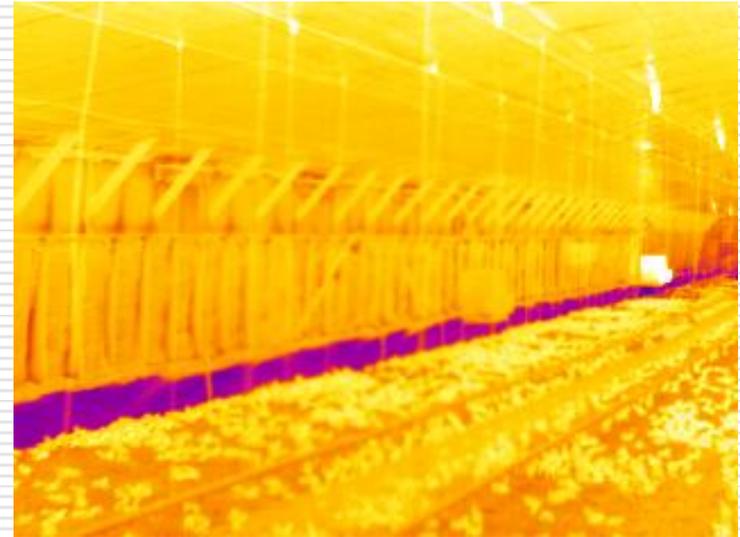
# Heat Loss Comparison

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**Thermal images taken in two similarly constructed broiler houses**



**Curtain side wall -  
temperature below  
freezing**

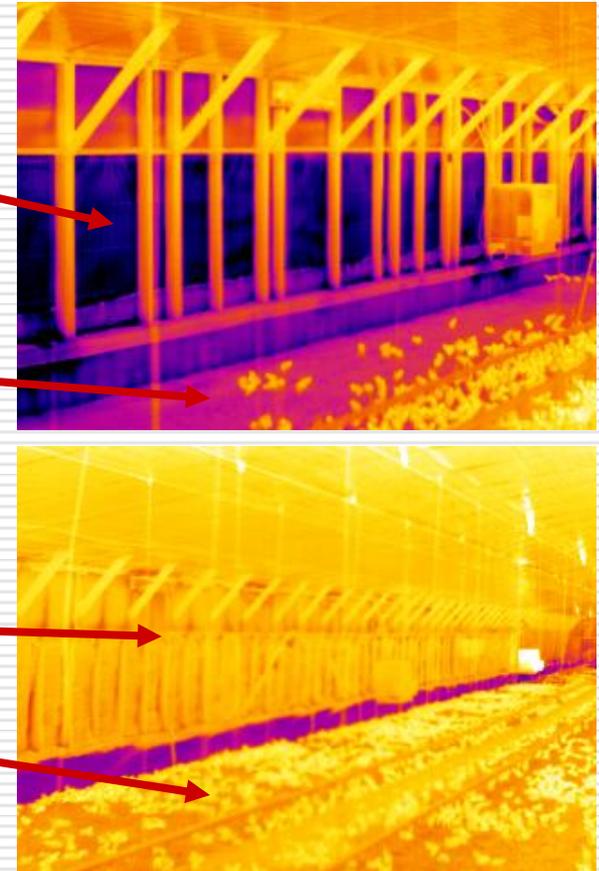


**Curtain sprayed with  
polyurethane insulation -  
temperature below freezing**

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# Heat Loss Comparison

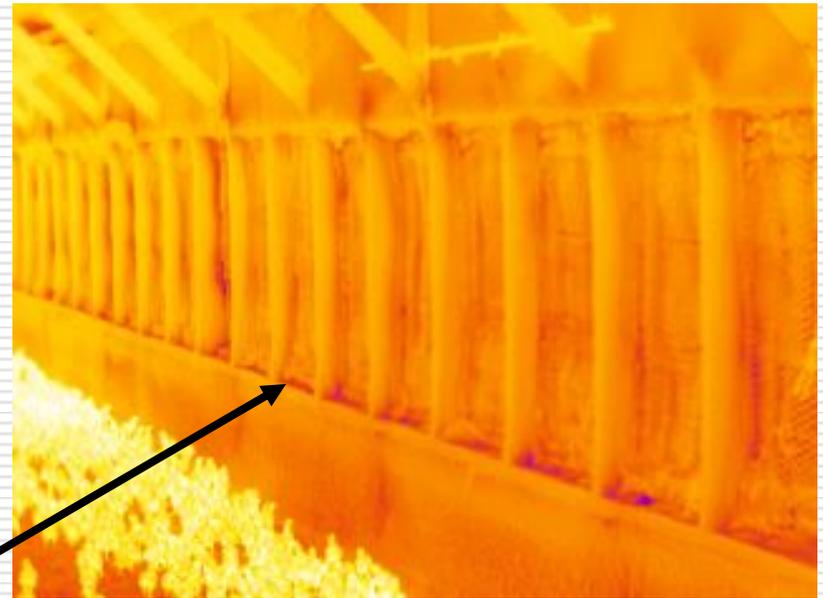
- **Cold curtains are strong indicator of significant heat loss through the curtain**
- **Cold floor temperature near curtains is a result of radiant heat loss from the floor as heat from the floor is lost to the curtain**
- **Closed Cell Polyurethane Foam:**
  - **No heat loss in curtains**
  - **No heat loss in floor**



# Concrete Walls/Closed Cell Foam

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- ❑ Typically, Polyurethane foam is applied at 2 lbs/ft
- ❑ Concrete applications (footers) are sprayed between 5 lbs/ft & 10 lbs/ft
- ❑ Reduced thickness is prone to bird damage
- ❑ Very little heat loss (thermal image)
- ❑ Leakage eliminated



**Curtain and concrete block sprayed with polyurethane insulation**

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# Concrete Walls/Bird Damage

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**2 lb foam application**



**Bird damage to 2 lb  
Polyurethane insulation**

**10 lb foam application**



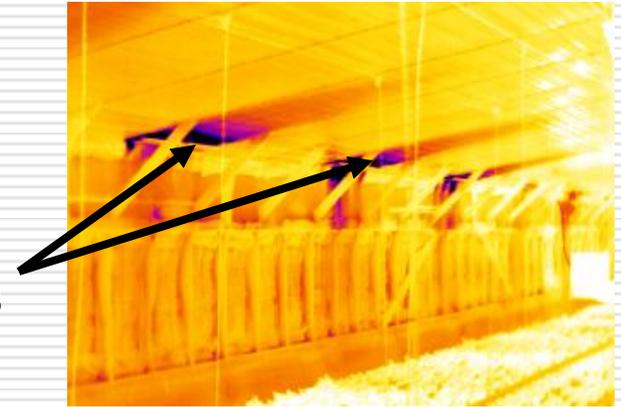
**Very little bird damage to 10  
lb Polyurethane insulation  
applied to concrete stem wall**

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# Positive Results

## Case Study

- ❑ **No condensation forming on the concrete**
- ❑ **Reduction in air leakage improved performance of the house's inlet ventilation system**
- ❑ **Only fresh air entering the house was from the air inlets at the top of the ceiling**
- ❑ **Fuel usage approximately half of previous winter**
- ❑ **Owner reports that fuel usage was approximately half that of his neighbors with similar curtain-sided houses with chicks placed at the same time**
- ❑ **Results attributed to environmental control**



**Air entering through inlets in a house where the curtain was sprayed with polyurethane insulation**

# Positive Results

## Testimonials

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***"I saved close to \$1,600 per week on my four houses; the first couple of weeks after the job was finished. Also, my static pressure has more than doubled."***

***Bucky Malcom***

***Bostwick, GA***

***Harrison Farms Grower***

***"The product works great and my floors are the driest they have ever been. My fuel cost has been cut by over half this flock."***

***Mike Moore***

***Calhoun, GA***

***Pilgrim's Pride Grower***

***"My first batch of chickens was 101 points above average and 44 points above average on fuel. During the growing cycle the most fans I had to run was 4 compared to my other farms where I had to run 6 and 7 fans."***

***John M. Gardner***

***Floral, AL***

***Perdue Grower***

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# Potential Problems

## Darkling Beetles

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- ❑ Damage from darkling beetles
  - Depends on beetle population
- ❑ Beetle damage is prominent in areas where birds pecked away harder surface of foam, exposing the softer insulation underneath
- ❑ Houses must be cleaned ever flock or every other flock



NOTE: If producer can't control their beetles, it is questionable if spray polyurethane foam insulation is the right choice for enclosing their curtain-sided houses

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# Potential Problems

## Wood shavings

- ❑ Spray polyurethane is prone to damage from chunks of wood and rocks thrown by shavings truck when fresh bedding is added to the house
- ❑ The small holes, not causing significant heat loss, offered another avenue for darkling beetles to gain access to softer interior of the foam



# Eliminating the Problems

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- ❑ Switch to a higher density foam
  - Downside is higher initial costs
- ❑ Spray Polyurethane insulation with some type of coating to make it harder for beetles to burrow into the insulation
  - Cost is higher but improves the life of the product



# Spray Polyurethane is a viable option

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❑ **Costs for spraying a four foot curtain in a 500 ft house runs between \$3,500 and \$5,000**

**(Return on investment can be as soon as two growing cycles)**

**Question: How long will spray polyurethane foam last?**

✓ **If beetle populations are kept at a minimum**

✓ **If insulation is protected from sunlight**

**Answer: It is not unreasonable to expect a life as much as ten years.**

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# Information obtained from:

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## Poultry Housing Tips

University of Georgia

Cooperative Extension Service

College of Agricultural and Environmental Science/ Athens, Georgia

Michael Czarick, Extension Engineer

Brian Fairchild, Extension Poultry Scientist

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