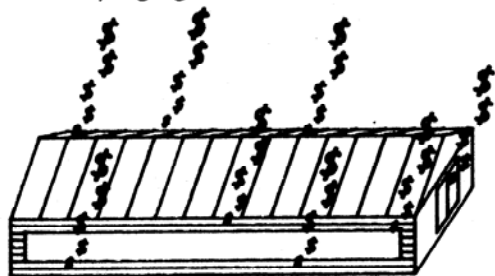




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Minimizing Heating Costs in Broiler Houses

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With temperatures in the 90's, reducing fuel bills is the last thing on most of our minds. But, within a month or two, cold evenings will be the norm, and so will high heating bills. Thus it is important to get your houses in order now, so that you don't get caught having to winterize your houses the night before chicks are scheduled to arrive.

If you are like most producers, with limited funds and time, you can't fix everything in the house which needs repairing or upgrading so where should you start? Like any decision concerning where to spend your time and effort it is vital to know what modifications would have the greatest potential for return.

Table 1 is a breakdown of the heat loss from an average curtain-sided broiler house. By multiplying your yearly heating bill by the various percentages you can calculate just how much money is being lost through the various building surfaces (Table 2). With this information you can target your efforts to those areas which are costing you the most. It is critical to balance the possible reduction in energy usage with the cost of upgrading. For instance, decreasing heat loss through the curtain by installing a double curtain would typically be more cost effective than adding ceiling insulation.

By examining these tables it becomes evident that one of the largest heating costs is ventilation and infiltration. This area is one with which most producers can become more energy efficient with minimal cost. In order to minimize energy costs in this area it is very important to know the difference between ventilation and infiltration. Ventilation is that air which is brought in when the timer fan is on. Infiltration is that air which enters the house when the timer fan is off. Ventilation is a necessity, infiltration is wasteful.

Ventilation is required to supply the birds with fresh air and to help remove excess moisture and ammonia. This air is very important to the health of the bird and should not be reduced. By using Table 3 you can calculate on any given day just how much ventilation air is required. If the air is brought in and mixed properly, heating costs will be minimized and bird performance can be maximized.

Infiltration is excess air that creeps in mostly through cracks along sidewalls. Since this cold outside air is much heavier than the warm inside air, it quickly drops to the floor upon

PUTTING KNOWLEDGE TO WORK

entering the house. This leads to a number of problems. As the cold air moves across the floor young birds are exposed to stressful drafts. At the same time the cold air moves like a wedge, displacing the warm air near the floor, forcing it towards the ceiling and away from the birds causing even further chilling. As the temperature of the air near the floor begins to decrease, brooders are activated generating warm air which again will typically be displaced towards the ceiling. Finally, since the air near the floor has not been heated, its moisture holding capacity is relatively low. It is only able to absorb a little moisture from the litter and caking is much more likely to occur.

In terms of excess heating costs alone, infiltration can be quite costly. To put into perspective, when brooding young chicks on a 40°F night, approximately 7 gallons of propane is lost through the sidewall curtain. This is due to the curtain not being very well insulated. The same amount of heat would be lost through a 400', ¼" crack if there was an outside breeze of only 1 mph.

Tightening up a house is by far the most inexpensive repair a producer can perform in an effort to minimize heating costs. All that is required is some caulking compound, felt paper, wood planks, and a few hours of time. Listed below are some things to be aware of when tightening up your broiler houses.

1. Smoke bombs can be used to detect areas of leakage.
2. Make sure that the curtain fits tightly against the side of the house.
3. Load outdoors can be covered with plastic.
4. Seal holes in tri-ply.
5. Make sure exhaust fans fit tightly in sidewall.
6. Cover unused exhaust fans with plastic.
7. Cover evaporative cooling pads.
8. Apply caulking from the outside of the house to form a better seal.
9. Place plastic and felt paper on the outside of the house to insure a tight seal.

TABLE 1

Breakdown of Heat Loss for a Curtain-Sided Broiler House
 Curtain-sided, 4' Curtain Uninsulated sidewalls
 Half house brooding Drop ceiling with 3½" of fiberglass

Building Surface	Percent of Heating Bill
Doors	1%
Endwalls	2%
Curtain Divider	7%
<u>Brooding half of house</u>	
Curtain	20%
Ceiling	13%
Sidewalls	7%
<u>Nonbrooding half of house</u>	
Curtain	10%
Ceiling	6%
Sidewalls	4%
Ventilation and Infiltration	30%

TABLE 2

Breakdown of \$2,000 Yearly Fuel Bill

Building Surface	Heating Costs	
Doors	1%	(1/100) x \$2,000 = \$ 20
Endwalls	2%	(2/100) x \$2,000 = \$ 40
Curtain Divider	7%	(7/100) x \$2,000 = \$140
<u>Brooding half of house</u>		
Curtain	20%	(20/100) x \$2,000 = \$400
Ceiling	13%	(13/100) x \$2,000 = \$260
Sidewalls	7%	(7/100) x \$2,000 = \$140
<u>Nonbrooding half of house</u>		
Curtain	10%	(10/100) x \$2,000 = \$200
Ceiling	6%	(6/100) x \$2,000 = \$120
Sidewalls	4%	(4/100) x \$2,000 = \$ 80
Ventilation and Infiltration	30%	(30/100) x \$2,000 = \$600

TABLE 3
Minimum Ventilation Requirements

Calculating Minimum Ventilation Rates for Broiler Houses
(36" exhaust fans)

Ventilation Factors

Age (weeks)	Nighttime Temperature		
	Below 30°F	30° to 60°F	Above 60°F
1	0.10	0.10	0.15
2	0.15	0.25	0.25
3	0.25	0.35	0.40
4	0.40	0.50	0.65
5	0.55	0.65	0.75
6	0.60	0.70	0.80
7	0.70	0.80	0.90

Timer setting (minutes) = Ventilation factor x Number of birds (thousands)

Timer Setting Adjustments

- If there is a slight ammonia odor increase timer settings by 15 seconds.
- If there is a strong ammonia odor increase timer settings by 30 seconds.
- If litter is slightly dry decrease timer settings by 15 seconds.
- If litter is very dry decrease timer settings by 30 seconds.

EXAMPLE:

20,000 birds
2 weeks of age
30°F nighttime temperature

Timer setting = .15 x 20 (thousand)
= 3 minutes out of 10 for one fan
or
= 1½ minutes out of 10 for two fans