

# Automatic air inlets: do they pay for broilers?

SALISBURY, Md. — Ever since cost conscious poultrymen started cutting energy use in broiler houses in the early 1970's, air inlets have been a weak link in efficient house management.

Growers have added insulation to reduce winter heat loss. They have built tighter houses to reduce infiltration. They control the ventilation with great precision because over-ventilation wastes fuel. But until a couple of years ago, they still had to manually adjust the vent openings in the sides of houses.

It's just not physically possible for an operator to hand-adjust all these openings often enough to accommodate every change in the weather. As a result, half of the time they're open too far. And in houses ventilated by fans activated by time clock, they're open much too long.

On a 10 minute fan cycle — two minutes on, eight minutes off the vents remain open during the off period, letting a lot of heat escape.

The excessive flow of cold air through these vents can easily be stopped by installing an automatic air inlet controller. This opens the inlets when fans start, closes them when fans stop, and halts air leakage in-between. The control mechanism also senses air pressure and opens inlets just enough for constant air velocity based on the number of fans going in the house.

This constant velocity

gives more uniform air distribution and temperatures through the house. But most of all it saves fuel by closing when not needed.

It costs about \$1700 to install an automatic air inlet system in a 20,000 bird house.

The question is, at that price, will it pay to use one?

To answer this question, University of Delaware extension agricultural engineer Ernest Walpole and Norman Collins, a researcher in energy management at the Delaware Agricultural Experiment Station, predicted the amount of air infiltration that occurs under different management practices in different types of broiler houses, using actual winter weather data collected on an hourly basis at the Salisbury airport.

They used this information to determine how much fuel and electricity were needed to maintain optimum growing conditions inside each type of house. Their calculations were based on energy costs, electricity and fuel, and building costs amortized over a 20 year period at an estimated annual inflation rate of 10 percent.

They've come up with a dollar and cents value for the use of automatic air inlets under each condition and feel they're now able to tell growers whether or not it will pay to install them. Their figures show that the amount of benefits depends on the type of house, type of fans used, and whether or

not these are controlled by time clocks

In the study they compared whole house brooding with time clock ventilation, end room brooding in three sections with time clock ventilation, and end room brooding in two sections with variable speed fans, all with both manual and automatic air inlets.

They found that with whole house brooding and ventilation by time clock, installing automatic inlets would save about \$80,000 in 20 years.

"At today's cost," says Walpole, "it saves you \$11 per thousand birds to go to automatic inlets in this type of house. This gives you a savings of about \$1300 the first year — almost enough to pay back the cost of installing the system"

The major savings is in fuel. Electricity costs remain almost constant for all types of housing compared.

Automatic air inlets in a house with end brooding and time clock ventilation will save you about \$58,000 over a

20 year period, with a fuel savings of about \$8.20 per flock, or roughly \$1,000 a year.

With end room brooding and variable speed fans you only save about \$2400 over 20 years with automatic air inlets. This represents an annual fuel savings of about \$125. Though the total savings is lower, the system will still pay for itself over a 20 year period, points out Walpole.

This study was part of an on-going energy conservation, energy-use analysis of broiler growout

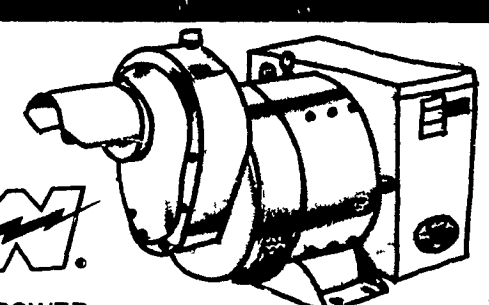
operations which Collins and Walpole began back in 1974.

Almost every year since then the engineers have come out with some data which has practical benefit for poultrymen. In the past they've recommended minimum winter ventilation rates, provided information on economic amounts of insulation, recommended end brooding, energy efficient fans, and effective broiler house width.

Purpose of this joint research and extension project is to find out where growers can save energy and reduce production costs.

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