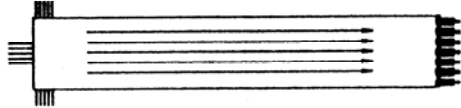




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Fogging Nozzles in Tunnel-Ventilated Broiler Houses

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Tunnel ventilation is rapidly becoming the preferred method of cooling birds during the warm summer months. Tunnel-ventilated houses provide a significant wind-chill effect throughout the house and facilitate the use of evaporative cooling pads. The combination of the wind-chill effect and evaporative cooling has led to significantly improved performance during even the hottest of days.

A number of producers are beginning to install fogging nozzles to reduce air temperature rather than using the traditional evaporative cooling pads. The use of fogging nozzles significantly reduces installation and maintenance costs associated with evaporative cooling pads. Many producers have reported that houses with fogging nozzles do just as well as houses with evaporative cooling pads.

When looking into using fogging nozzles in tunnel-ventilated houses, certain design criteria should be followed. If too few nozzles are installed or installed improperly, potential benefits may be lost.

The uniform air movement in a tunnel-ventilated house allows most producers to install triple the number of fogging nozzles found in most traditional, naturally-ventilated, curtain-sided houses. In a naturally-ventilated house, the limiting factor in the number of fogging nozzles installed is litter moisture. The more nozzles the greater the cooling, but the greater the mess. In a tunnel-ventilated house, the fine droplets emitted from the nozzles tend to stay suspended longer, increasing the likelihood of evaporation. Water which is not immediately evaporated is evenly distributed on the surfaces of the birds throughout the house and is later evaporated as air moves over their bodies.

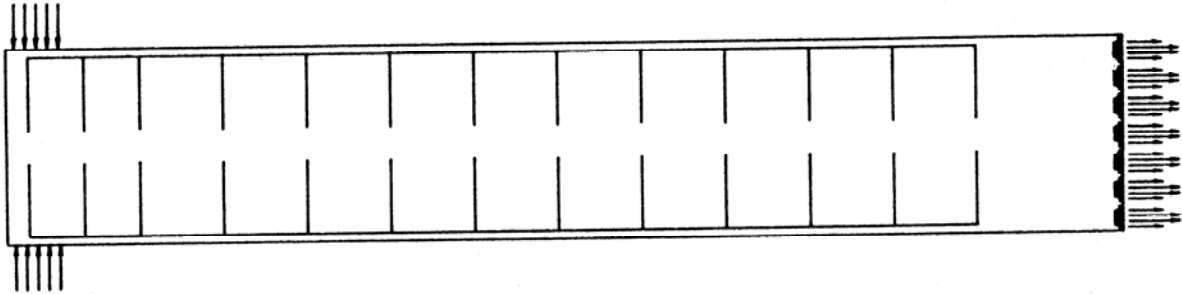
In general, the upper limit of the amount of moisture you should add to a tunnel-ventilated house is approximately 10 gallons/hour for every 10,000 cfm of exhaust fan capacity. It is important that the amount of water that is added to the house can be regulated. On very hot, dry days you may want to run all of the fogging nozzles for maximum cooling. But on humid days, or on days where you want just a little cooling, you may only want to use half or maybe even a third of the nozzles.

Unlike evaporative cooling pads, it is impossible to perform all the necessary cooling of the air as it enters the house. If too many nozzles are placed where air enters the house, the water will not evaporate and will be deposited on the litter creating a mess. Another problem with cooling the air as it enters the house is that as the air moves down the house

PUTTING KNOWLEDGE TO WORK

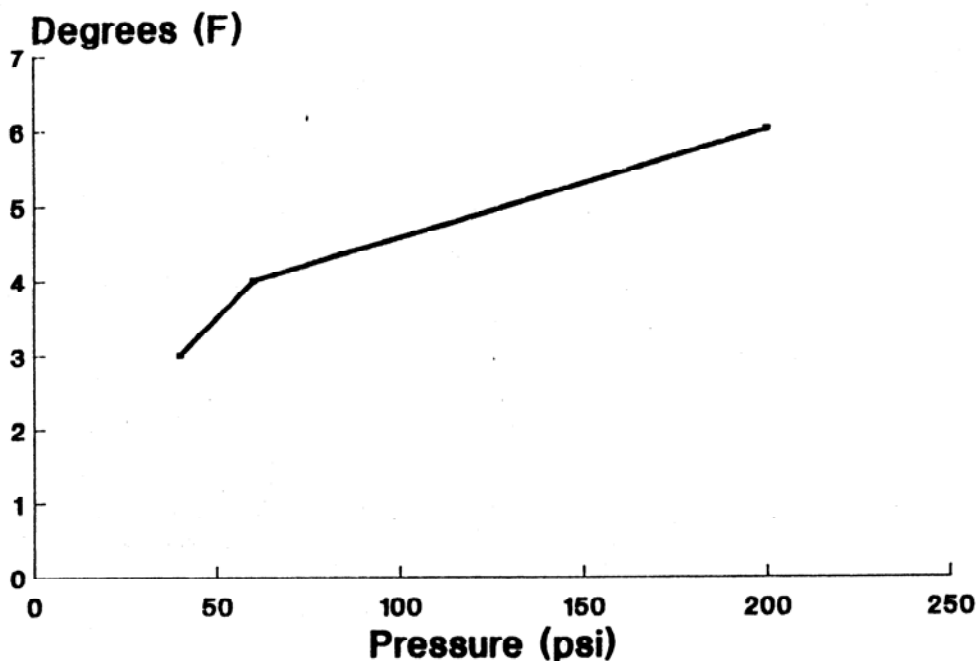
it will heat up. This may lead to significant temperature differences between the front and the rear of the house (a common problem in houses with evaporative cooling pads).

To avoid these problems it is best to evenly distribute fogging nozzles throughout the house with a few extra nozzles placed where the air enters the house. This will lead to more even distribution of excess moisture and at the same time tend to keep the house temperature more uniform. There should be some flexibility in the design of the fogging system so that more water can be added in the front or rear of the house if a temperature differential begins to occur.



One way to increase the efficiency of the fogging system is to increase water pressure. As water pressure increases, the amount of moisture put out by the nozzles increases. In fact, if you increase the water pressure from 100 to 200 psi, the volume of water put out by the nozzles increases by 50 percent. Furthermore, as water pressure increases, the size of the droplets emitted from the nozzles decreases. The smaller droplets tend to stay suspended for a longer period of time and evaporate faster. Therefore, with a higher pressure system not only do you put out more water, you put out smaller water droplets, leading to significantly increased cooling.

Cooling Potential of Misting Nozzles



Other things to consider when installing a fogging system in a tunnel-ventilated house are:

- 1) Use schedule 40 PVC pipe. It is stronger and will hold up better under higher water pressures.
- 2) Protect fan thermostats from water put out by the nozzles. If the thermostats get wet, they will shut off exhaust fans prematurely.
- 3) Don't add water unless you have at least $\frac{3}{4}$ of your fans running. With fewer fans there isn't sufficient air movement within the house to keep the droplets suspended. This will lead to litter wetting.
- 4) Use 1 gallon/hour nozzles. They put out smaller droplets which are more likely to evaporate. Two and three gallon per hour nozzles are more likely to cause litter wetting.
- 5) Fogging nozzles should not be placed within 60' of the exhaust fans. If fogging nozzles are placed too close to the fans, the water will be exhausted from the house leading to increased dust collection on exhaust fan shutters.
- 6) Fogging nozzles should be placed on lines which run across the house, not down the length of the house. The main lines which feed the lines running across the house should not have any nozzles on them. This will allow the nozzle lines to drain to these main lines, thus minimizing dripping.