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Poultry Housing Tips

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Guidelines for Operating Tunnel-Ventilated Broiler Houses

One of the first questions a grower with a new tunnel-ventilated house will commonly ask is, "How do I operate it?". This question is usually followed by about a dozen more specific questions. For example:

> How many exhaust fans do I run and at what age?
> When do I use my fogging system?
> When do I go to tunnel ventilation? What age? What temperature?
> When should I use natural ventilation?

Though it is difficult if not impossible to "cookbook" the operation of a tunnel-ventilated house, there are a number of guidelines to give a grower a point from which to start. Over time, by watching their birds, growers can fine tune these guidelines to what works best for their particular situation.

The charts on the following pages are based on a few simple principles.

1) Tunnel ventilation is for cooling birds. If you are not trying to cool the birds, it should not be used.

2) The average windchill effect in a tunnel-ventilated house with mature birds and all fans operating is approximately 10°.

3) A young bird does not require as much cooling as an older bird. Four-week-old birds are generally not well-feathered, and there is a lot more space between individual birds. As a result, it does not take as much air movement to create a 10° wind chill effect with this age bird as it does in the case of eight-week-old, fully feathered birds packed tightly together.

4) In a curtain-sided house containing large birds it will be three to ten degrees warmer inside than outside even with the curtains fully opened during warm weather. As a result, it is usually best to continue to use tunnel ventilation until outside conditions are about five to ten degrees cooler than the desired inside temperature.

5) High-pressure fogging systems can be used without running all the exhaust fans. In most cases, four to five 48" fans have to operate before a fogging system can be used. When using fogging nozzles with only four or five 48" fans, no more than 10 nozzles per fan should be used.

Tunnel Ventilation System Operation

House Specifications:

500' broiler house
Eight slant wall 48" fans (152,000 ft3/min.)
High pressure fogging system (240 psi)

- approximately 160, 1 gal/hr nozzles.
- fogging nozzles come on in two stages (80 nozzles per stage).
- nozzles on lines running across the house, half of which have cutoffs.

320 ft2 - 400 ft2 of tunnel inlet opening
7" X 44" side wall inlets on 15 to 20 ft. centers (both side walls)

Week #1

Desired temperature range= 85° to 90°

Many producers partial-house brood the first week or two of the growout. Tunnel ventilation is usually unnecessary and in most cases inappropriate these first two weeks. However, if young chicks do become **severely** heat stressed, tunnel ventilation can and should be used.

Begin tunnel ventilation = 95° (inside temperature)
Out of tunnel ventilation = 90° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range	Number of fans running	Fogging nozzles (total)
95°	5°	2- 3 (locked on)	none
98°	8°	4 (stage 1 fogging)	40

Week #2

Desired temperature range = 83° to 88°

Begin tunnel ventilation = 90° (inside temperature)
Out of tunnel ventilation = 85° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range	Number of fans running	Fogging nozzles (total)
90°	2°	3 (locked on)	none
92°	4°	4 (stage 1 fogging)	40

Week #3

Desired temperature range = 80° to 84°

Begin tunnel ventilation = 86° (inside temperature)
Out of tunnel ventilation = 80° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range	Number of fans running	Fogging nozzles (total)
86°	2°	3 (locked on)	none
88°	4°	4	none
90°	6°	5 (stage 1 fogging)	50

Week #4

Desired temperature range = 74° to 78°

Begin tunnel ventilation = 80° (inside temperature)
Out of tunnel ventilation = 73° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range	Number of fans running	Fogging nozzles (total)
80°	2°	3 (locked on)	none
82°	4°	4	none
84°	6°	5	none
86°	8°	5 (stage 1 fogging)	50
88°	10°	6 (stage 2 fogging)	60

Week #5

Desired temperature range = 72° to 77°

Begin tunnel ventilation = 77° (inside temperature)
Out of tunnel ventilation = 68° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range	Number of fans running	Fogging nozzles (total)
77°		3-4 (locked on)	none
79°	2°	4	none
81°	4°	5	none
83°	6°	6	none
85°	8°	6 (stage 1 fogging)	60
87°	10°	7 (stage 2 fogging)	120

Week #6

Desired temperature range = 70° to 75°

Begin tunnel ventilation = 75° (inside temperature)
Out of tunnel ventilation = 65° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range	Number of fans running	Fogging nozzles (total)
75°		4 (locked on)	
77°	2°	5	
79°	4°	6	
81°	6°	7	
83°	8°	7 (stage 1 fogging)	70
85°	10°	7 (stage 2 fogging)	140

Week #7

Desired temperature range = 70° to 75°

Begin tunnel ventilation = 75° (inside temperature)
Out of tunnel ventilation = 65° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range.	Number of fans running	Fogging nozzles (total)
75°		4 (locked on)	
77°	2°	5	
79°	4°	6	
81°	6°	8	
83°	8°	8 (stage 1 fogging)	80
85°	10°	8 (stage 2 fogging)	160

Week #8

Desired temperature range = 70° to 75°

Begin tunnel ventilation = 75° (inside temperature)
Out of tunnel ventilation = 65° (outside temperature)

House Temperature (thermostat settings)	Degrees above desired temperature range.	Number of fans running	Fogging nozzles (total)
75°		4 (locked on)	
77°	2°	5	
79°	4°	6	
81°	6°	8	
83°	8°	8 (stage 1 fogging)	80
85°	10°	8 (stage 2 fogging)	160

Fine Tuning Tips

1) Do not switch from tunnel ventilation to natural ventilation until the outside temperatures listed in the guidelines are actually reached. For instance, if you had seven-week-old birds and outside temperature was going to drop to 65° sometime that night, the switch from tunnel to natural should not be made until it is actually 65°. If it is only going to be 65° or lower for just a few hours, it would probably be best just to stay in tunnel ventilation.

2) If you expect the house temperature to exceed the high temperature of the desired temperature range for only a short period of time, you can opt not to switch over to tunnel ventilation.

3) If the birds appear too warm with the recommended number of fans running, add another fan to the last stage and add 20 more nozzles to the second stage of the fogging system.

4) For birds four weeks and older, if house temperature exceeds 89°, add more fogging nozzles to the second stage of the fogging system. If the additional fogging nozzles cause excessive house moisture, turn on another fan.

5) If the temperature difference between the inlet and exhaust fan ends of a house with the minimum number of fans operating is greater than 6°, increase the minimum number of fans running by one. If you believe that the house would be too cool if another fan is turned on, open side wall inlets half way in the fan end of the house.

6) Though usually not necessary, the tunnel curtains may sometimes require adjusting to help the fog mix better in the inlet end. If the curtain opening is reduced make sure that the static pressure does not exceed 0.06". This will ensure that fan performance is not compromised.

7) To maximize environmental control, cutoffs should be installed on at least half of the fogging nozzle cross lines.

8) If the fogging system is used during the first few weeks of the growout, use nozzles in first 1/4 of house.

9) Ten nozzles per 48" fan will reduce house temperature by approximately 5°. Twenty nozzles per 48" fan will reduce house temperature by approximately 10°.

10) Generally, the full first stage of fogging nozzles (stage 1) should not be used until outside temperature is 85° or warmer. The full second stage of fogging nozzles (stage 2) should not be used until outside temperature is 90°. It is important that at no time should fogging thermostats be set below 82°.

11) If you do not have a two-stage high pressure fogging system, use thermostat settings for stage 2.

12) If you do not have a high pressure pump you may have to:

- wait until five or six fans are operating before using the fogging system
- use fewer nozzles
- increase fogging system thermostats settings

13) On humid days the number of fogging nozzles used may need to be decreased.

14) To minimize house wetting, the fogging system should be wired through a 24 hour timer in addition to the thermostats. The timer should be set so that the fogging system cannot operate between 10 p.m. and 10 a.m.

15) Growers who switch between side-wall inlet ventilation and tunnel ventilation should delay switching to tunnel ventilation until their houses reach the high desired temperature. Two fan thermostats should be set two degrees above the minimum temperature (these two fans would also be operating off of an interval timer). One or two more fans, depending on bird age, would be set to come on a couple of degrees later. For example:

Week #4

Two 48" fans on timers and thermostat setting of 74°
Two more 48" fans on thermostat settings of 76°
Switch to tunnel ventilation at an inside temperature of 80°

The desired temperature ranges listed in the guidelines above are subject for debate. Differences in bird strains and feed formulation could result in higher or lower desired temperature ranges. If your desired house temperature is higher or lower than those described above, adjust your fan and fogging system thermostats accordingly.

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Putting Knowledge to Work

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