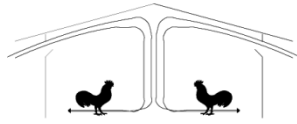




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Poultry Housing Tips

Negative Pressure Ventilation Without
Adjustable Air Inlets

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Negative pressure ventilation is the most popular ventilation system used by broiler producers in the Southeast. Through the use of exhaust fans and adjustable air inlets, growers have found that they can more easily rid the house of ammonia and excess moisture, maintain more consistent house temperatures, and at the same time keep energy usage to a minimum. These benefits are due to the fact that a negative pressure ventilation system gives the grower more control over air exchange and air distribution. Controlling these two factors gives the grower more control over his paycheck. The amount of fresh air brought into the house can be accurately controlled through the use of exhaust fans and interval timers. If the grower wants 4,000 cfm of fresh air, he sets the timer on a couple of 36" fans for one minute out of five. If he wants twice as much fresh air, he doubles his timer setting. The grower doesn't have to concern himself with how hard the wind is blowing and from what direction. He knows that if his static pressure is right and his inlets are properly adjusted, the cold incoming air will mix with the warm air near the ceiling preventing bird chilling, thereby improving bird performance.

The "ideal" negative pressure ventilation system would consist of at least six 36" fans (or a combination of 36" and 48" tunnel fans), a four-foot by six-inch adjustable air inlet every 15 to 20 feet along both side walls, an inlet machine to control the amount of inlet opening, and a five minute timer. With this type of system a grower could handle ventilation during the fall, winter, and spring with minimal effort.

Almost all new houses are being built with inlets and controllers; however, it is sometimes difficult to justify in older houses. In fact, in many cases it is much more cost effective to modify the ventilation system in an older house in steps. With each step taken growers usually find an increase in production efficiency. Some of the associated profits can then be taken to finance the next step to hopefully increase production efficiency even further.

STEP 1: EXHAUST FANS

A broiler house should have a minimum 10,000 cfm of exhaust fan capacity for every 100 feet of house length. A 400' house could have four 36" fans (10,000 cfm) or a couple of 36" fans and a single 48" fan (20,000 cfm). At least two 36" fans should be in the brooding area. But the remainder of the exhaust fans can be placed anywhere in the house. The exhaust fans should be controlled by a single five-minute timer. If this is not possible, use a maximum of two timers and make sure that they are synchronized. Each exhaust fan should have a thermostat.

You are now ready to begin using negative pressure ventilation.

1. Roll the curtains all the way up.
2. If your house is
 - o 300 feet long - turn on three 36" fans, or one 36" fan and one 48" fan
 - o 400 feet long - turn on four 36" fans, or two 36" fans and one 48" fan, etc.
 - o 500 feet long - turn on five 36" fans, or three 36" fans and one 48" fan, etc.
3. Check the static pressure. (Static pressure gauges can typically be purchased for less than 30 dollars.)
4. If the pressure is
 - o Above 0.10" - your pressure is too high and you should turn off an exhaust fan.
 - o Below 0.05" - the house is too loose and must be tightened up and the pressure rechecked.
5. Set the timer according to the chart below (these are **minimum** settings).

Minimum Timer Fan Settings		
Bird Age	Three 36" timer fans (minutes on out of five)	Four 36" timer fans (minutes on out of five)
1	30 sec	30 sec.
2	45 sec.	45 sec.
3	1 min.	1 min.
4	1 min 30 sec.	1 min 15 sec.
5	2 min. 15 sec.	1 min 45 sec.
6	2 min 30 sec.	2 min.
7	3 min.	2 min.15 sec.
8	3 min. 15 sec.	2 min.30 sec.

- 6.
7. Set fan thermostats either at or a couple of degrees above the desired house temperature.
8. Set curtain machine a couple of degrees above the fan thermostats. If you do not have a curtain machine, lower the curtains once exhaust fans can no longer maintain desired house temperature.
9. With a negative pressure you are now drawing fresh air in through cracks throughout the entire house. As much air is coming in the cracks next to the fans as through the cracks 100 feet from the fans. In addition, you have minimized the effects of wind on the house.

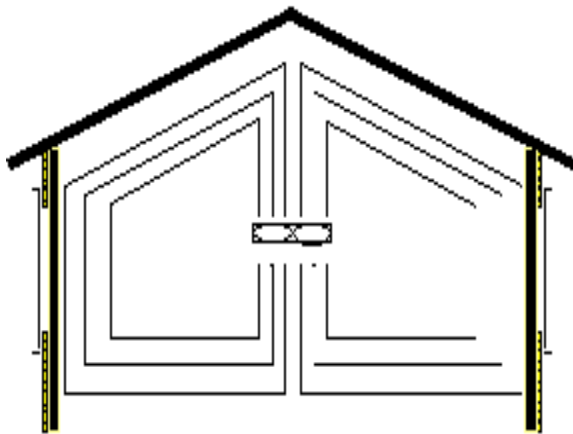
You may feel that by closing curtains tight you are not drawing in any air and you are going to suffocate your birds, but as long as the pressure is below 0.10" each 36" fan is drawing approximately 10,000 cubic feet of fresh air into the house each minute. If you don't believe it, buy some smoke emitters or a bee smoker and have someone walk along the outside of the house and you will see the fresh air being drawn into the house.

One of the problems with drawing air through the cracks in an older house is that the cold incoming air doesn't mix with the hot air near the ceiling. One way to mix the air, besides the use of adjustable air inlets, is through the use of mixing fans.

STEP 2: MIXING FANS

Many older houses have stirring fans which are used during warm weather to cool the birds. These fans can be used effectively during cold weather to improve air quality, temperature uniformity, and litter conditions as well as reduce fuel usage.

There are a number of ways to install circulation fans to help in mixing the air drawn in through cracks with the warm air near the ceiling. The key to their installation is trying to mix the air without producing a lot of air movement over the birds or pushing all the warm air to one end of the house.



One way to accomplish this is to install 36" fans so they blow air straight up against the ceiling. As the air hits the ceiling, it moves the hot air over toward the side wall so it mixes with the cool fresh air entering through the cracks in the side walls. By the time the air has made it to the floor, it is not moving fast enough to cause bird chilling but is enough to promote litter drying.

The fans should be hung five to six feet off the floor and controlled by a five-minute timer. There should be a minimum of one 36" fan (ideally one and a half) for every 100 feet of house length. Preferably the circulation fans can be coordinated with the side wall exhaust fans but this is not crucial. Generally speaking, the circulation fans should run slightly longer than the exhaust fans.

A continuing effort should always be made to make the house tighter. The tighter the house, the lower the heating cost. Eventually you will reach the point that three 36" fans generate more than a 0.10" pressure. At this point you are now ready to install adjustable air inlets to gain even more control.

Some growers have installed a one-inch board crack or small circular inlets (air cannons) in an attempt to economize on inlets. Though the initial cost may be a little lower, the flexibility and the air mixing produced by these type of inlets is very limited. In the long run most growers will find that they are much better off to go straight to adjustable air inlets.

STEP 3: AIR INLETS

Typically the first place air inlets are installed are in the side wall opposite the fans. A basic system would consist of placing one four-foot by six-inch inlet every 20'. These inlets should be installed as near the ceiling as possible with at least a six-inch board beneath the inlet for the side wall curtain to close upon. The step by step operation of these inlets is covered in the newsletter "10 Simple Steps for Effective Negative Pressure Ventilation" (January, 1994).

The key to poultry production is control. With increased control over the environment in the poultry house, the grower will have increased control over production and therefore increased control over his paycheck.

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