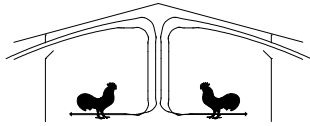




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# Poultry Housing Tips

## Frequently Asked Questions About Counter-Weighted Attic Inlets

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As covered in past *Poultry Housing Tips* counter-weighted attic inlets have shown to be a very effective method of ventilating broiler houses during cooler times of the year. Though there is still much research that needs to be conducted on their use in poultry houses, the following are answers to some of the more frequently asked questions:

### *How many counter-weighted attic inlets should I install?*

The primary purpose of the attic inlets is to provide preheated air for use during minimum/timer fan ventilation. In general larger houses use more fans for minimum ventilation than smaller houses and therefore require more attic inlets than smaller houses. The general recommendation for number of attic inlets is:

40' X 400' = 10 - 12

40' X 500' = 12 - 14

50' X 500' = 16 - 18

These recommendations are based on a research conducted to date using the TJ4200 which has maximum air moving capacity of approximately 2,000 cfm @0.10" static pressure. It is possible to use other types of attic inlets and the number required would be adjusted based upon their maximum air moving capacity.

### *How should attic inlets be spaced in a house?*

Like traditional side wall inlets, evenly down the length of a house.

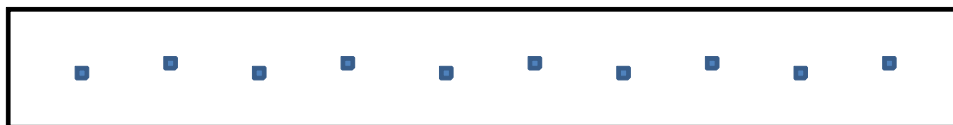


Figure 1. Staggered attic inlets (top view)

## PUTTING KNOWLEDGE TO WORK

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*Where in the ceiling should the attic inlets be located?*

Attic inlets should be placed along side the peak of a dropped ceiling, alternating on either side of the peak (the hottest air is near the peak of the attic). In wider houses where there are feed and water lines down the center of the house, attic inlets can be installed two or three feet from the peak of the dropped ceiling (Figures 1, 2 and 3).

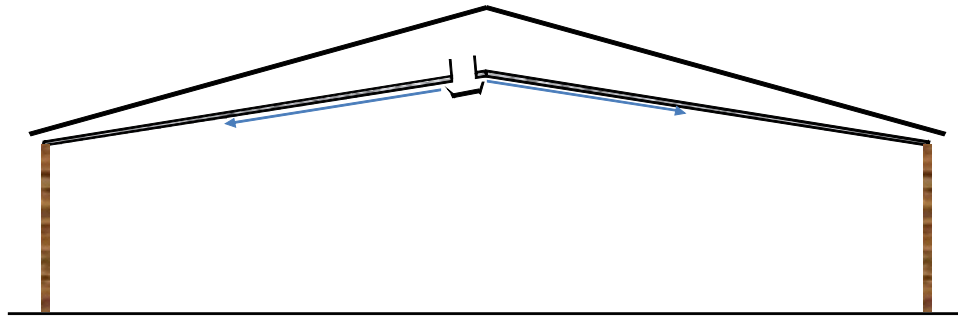


Figure 2. Attic inlet placement in a 40' wide broiler house.



Figure 3. Attic inlets placement in a new 50' wide broiler house

*Can I install attic inlets in curtain-sided houses?*

One of the keys to maximizing the effectiveness of attic inlets is that a house needs to be very tight. For instance, if it takes three 36" fans to obtain a static pressure of 0.07 with everything closed up, very little air will come through the attic inlets because of the large number of cracks in the side/end walls. The tighter a house the more warm air that will be pulled through the attic inlets and the less cool air that will be pulled through cracks in the side wall. This is why attic inlets will tend to be more effective in totally enclosed houses than curtain-sided houses. That being said, if you can obtain a static pressure of at least 0.13" (ideally +0.15") with two 36" fans with everything closed in a curtain-sided house attic inlets will likely prove effective.

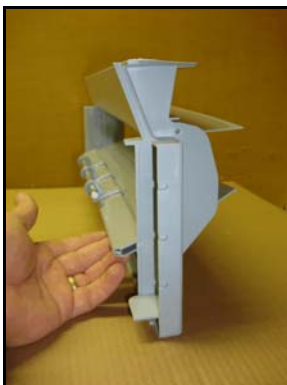


Figure 4. Side and top views of one side of a the four-sided TJ4200 attic inlet (metal bar is the counterweight).

*Do I need an inlet machine to open and close counter-weighted attic inlets?*

No. Each of the four doors of the TJ4200 attic inlet (only attic inlet studied to date) is counter-weighted with a steel bar. When there is no negative pressure the counterweight holds the doors closed. When the static pressure exceeds 0.03" there is sufficient force to open the doors and allow fresh air to enter the house (Figure 4).

*Can I just install a traditional galvanized "side wall" inlet in the peak of my house instead of the counter-weighted attic inlet?*

Yes and no. Installing a traditional galvanized inlet would require the use of an inlet machine. You don't want to leave an attic inlet open when the fans are not operating for a couple of reasons. First, since a large percentage of the hot air produced by a brooder/furnace ends up at the ceiling leaving an attic inlet open would result in a substantial loss of valuable hot air. Furthermore, the air in a poultry house contains a significant amount of moisture. If this air were to enter the attic through an open inlet and come in contact with the cold metal roof, condensation would form leading to wet trusses and ruined ceiling insulation. Though the inlet machine would close the inlets when the timer fans are not operating and therefore solve the aforementioned problems it would significantly increase installation cost. Furthermore, most modern poultry house controllers are not capable of handling two inlet machines without involving some type of manual switching when you want to start using side wall inlets.

*How often do I need to manually close the attic inlets?*

For the most part the attic inlets have proven to require very few manual adjustments. Typically the attic inlets on the nonbrooding end are manually locked closed during brooding by simply pulling the upper blade down over the lower counter-weighted blade. Just as in the case with traditional side wall inlets as the birds spread to the nonbrooding end the attic inlets are unlocked so that they too can receive fresh air. Generally, the attic inlets are left open for the remainder of the flock during cold weather. During warmer times of the year the attic inlets are typically closed when the house starts to utilize tunnel ventilation (Figure 5).



Figure 5. Attic inlet with top blade in open and closed/locked positions.

*Can I use attic inlets during the summertime?*

During typical summertime conditions attic inlets have been found to be able to be used effectively for the first 7 to 10 days. After this time the use of attic inlets has been found to lead to excessive fan operation and possible premature transitioning to tunnel ventilation.

*What static pressure setting should I use in a house with attic inlets?*

Typically producers have found that a static pressure setting of between 0.10" and 0.12" works well for a house with attic inlets. Provided a house has a sufficient number of attic inlets this will typically mean that the side wall inlets will remain closed until a house's temperature control fan(s) (typically the first 48" fan) begins to operate. At this point the pressure will tend to rise above 0.12" causing the side wall inlets to open. The amount of warm air pulled from the attic can be lessened by decreasing the controller's static pressure setting once a house goes into more of a "cooling mode". Since the attic inlets are counter-weighted the lower a house's static pressure setting the more the side wall inlets will open and the more the attic inlets will close. Many modern poultry house controllers can automatically change static pressure settings when temperature control fans begin to operate.

*Does my ceiling have to be flat to use a counter-weighted attic inlet?*

No. The counter-weighted inlet doors are only marginally affected by the fact that they are installed on a slight slope in the typically dropped ceiling house with a "2/12" bottom cord slope. Testing found that when operating at a static pressure of 0.08" the side and "up hill" doors opened approximately 1 1/4" while the "down hill" door opened 1 1/2". Though probably not necessary this difference could be eliminated by adding a couple of 3/8" washers to the counter weight of the "down hill" door.

*In a new house do I install fewer traditional side wall inlets if I plan to install attic inlets.*

No. Though during cooler times of the year the addition of attic inlets would allow a producer to operate more fans through the combination of side wall and attic inlets before going to tunnel ventilation it is not advisable to install fewer side wall inlets. The problem is that there will be times when the attic inlets will be closed (i.e, older birds during the summer and spring) so if you reduced the number of side wall inlets you may have insufficient inlet area to supply the needs of the exhaust fans.

*How much gas will I save?*

The effectiveness of counter-weighted attic inlets in reducing fuel usage and improving litter and air quality is very dependent on how much you ventilate. That is during brooding if you have fresh litter or you don't care about high ammonia levels and you're ventilating just 30 seconds out of five or ten minutes there will not be a big advantage to installing attic inlets because you simply are not pulling in enough air to make a big difference. In contrast, if the birds are a couple of weeks old and you have to ventilate two minutes out of five to control ammonia the difference in fuel usage and litter quality tends to be more significant. The more aggressive a producer is about controlling air and litter quality the bigger the difference the attic inlets will make.

Other factors that affect fuel savings:

- 1) House tightness. The tighter the house the bigger the savings.
- 2) House size. The wider houses with larger attic spaces have shown more significant fuel savings than traditional 40' wide houses.
- 3) Weather. As one would expect, the sunnier the weather the more effective attic inlets are.

Because the effectiveness of the attic inlets like many things on poultry farms are tied to their management the fuel savings associated with their use has varied significantly from 5% to as much as 35%. The most consistent difference noted in houses with counter-weighted attic inlets is drier litter and improved air quality.



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