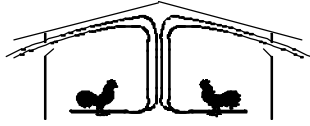




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## *Poultry Housing Tips*

### **Tunnel-Ventilated Pullet House Design Spreadsheet**

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A tunnel-ventilated pullet house with light traps is one of the most difficult types of poultry houses to design a ventilation system for. There are dozens of different types of light traps to choose from, each with differing abilities to reduce the amount of light entering the house. How much each of these light traps restrict air flow also varies widely and does not necessarily correspond with their “darkness”. As a result, some light traps are very dark as well as restrictive. Others are not very dark yet are very easy to pull air through. Still others are both very dark and are very easy to pull air through.

Complicating matters is that the amount of light trap required depends not only on the air moving capacity of the fans, but also how well the fans perform under pressure. As you might expect, the more fans installed the more light trap required. But, what many people do not realize is that the better a fan holds up under pressure (pressure created when pulling air through fan and inlet light traps) the less light trap is required. So, selecting the right fan can reduce the amount of light trap required and thus reduce costs, too.

Though there are general guidelines for the amount of light trap a house requires based on the total air moving capacity of the tunnel fans, these guidelines often leave many questions unanswered. For instance, how much more air will I move if I install two more light traps on my tunnel inlet? Would I move more air if I added another tunnel fan and did not install any additional light traps? What would happen if I added discharge cones to my fans without adding any light traps?

In the past, the answer to these questions would have been very difficult to determine. But, recently a new Excel spreadsheet has been created that allows the users to determine how the air moving capacity of fans would be affected by different amounts and types of light traps. All users have to do is to input the type of light trap they would like to install on the tunnel inlet as well as on the tunnel fans, the amount of air the fan they want to install moves at static pressure ranging from 0.00" to 0.30" (in 0.05" increments), and the number of fans. The spreadsheet then gives a suggested **minimum** amount of fan and inlet light trap required. The user can then enter this **minimum** or they can choose to enter a higher or lower amount if desired. After the amount of fan and light trap is entered the spreadsheet then calculates how much air each fan will move as well as the total static pressure the tunnel fans will be working against. Once the air moving capacity is determined, the user can then multiply the air moving capacity of the fan times the number of fans, and divide it by the cross-sectional area of the house to estimate tunnel air speed that will be achieved in the house.

The spreadsheet has ten different types of light traps from which to choose. Others will be added as performance test data becomes available. As with any software, there are a number of assumptions made which may affect the accuracy of the results. Some examples are:

- 1) The exhaust fans are properly maintained, i.e clean shutters, tight belts.
- 2) All of the light trap area inputted into the spreadsheet is available to the fans and is not obstructed by tunnel curtains or light trap framing.
- 3) The tunnel inlet light trap is not restricted by “dog houses” or sheds to shade the light trap.
- 4) The house is very tight, no air leakage.
- 5) Fan and inlet light traps are clean.

It may be beneficial to review the Poultry Housing Tips March 1998 newsletter, “Light Traps for Breeder Pullet Houses” before using the spreadsheet. The newsletter goes into more detail on the differences in light traps and how the static pressure caused by pulling air through them affects fan performance. This 1998 newsletter, as well as the Pulletvent3.0 spreadsheet, can be found at the web site [www.poultryventilation.com](http://www.poultryventilation.com).



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Provided to you by:

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# PulletVent3.0

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## Enter Blue Numbers

1) Enter type of light traps to be installed on fans, as well as tunnel opening

Enter Type of and Inlet Light Trap	
Fan Light Trap	1
Tunnel Inlet Light Trap	1
Acme Plastic=	1
General Shelters=	2
Black Air (old)=	3
Munters=	4
Acme Metal=	5
Munters Half Dark =	6
Brentwood Industries=	7
Black Majic =	8
W.W.F.=	9
Dayton =	10
Black Air (new) =	11

2) Enter the amount of air the fans you are planning to install move at the below static pressures

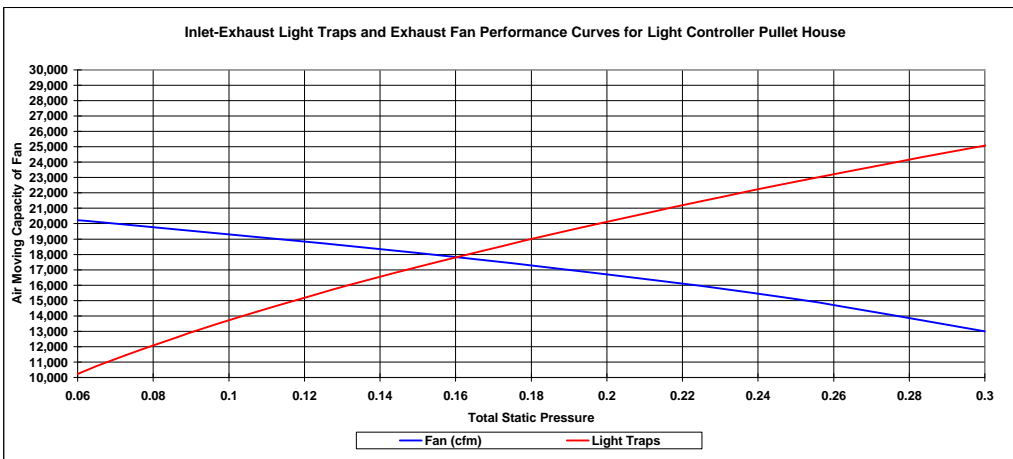
Tunnel Fan Information	
Number of Fans	7
Pressure ( " )	Fan (cfm)
0	21,000
0.05	20,400
0.1	19,300
0.15	18,100
0.2	16,700
0.25	15,100
0.3	13,000

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3) Enter the amount of light trap you are going to install  
- start with the MINIMUM  
- light trap should have a light reduction factor of at least 2,000,000

Light Traps	Total (sq. ft)	MINIMUM Recommendation (sq. feet)	Light Reduction Factor
Fan Light Trap	200	181	20,000,000
Inlet Light Trap	275	267	20,000,000

4) Where the red and blue lines cross is the predicted air moving capacity of the fans, as well as the total static pressure the fans will be working against.  
- Ideal pressure is between 0.15" and 0.18"  
(actual pressure and airflow experienced can vary due to house tightness as well as light trap and fan maintenance)



- Multiply the fan air moving capacity (where the two lines cross) by the number of fans and divide by the cross-sectional area of the house to obtain the average tunnel air velocity (MINIMUM air speed for pullet houses is 300 ft/min)
- If the static pressure is too high, increase light trap area or change the type of light trap used.
- If tunnel air speed is too low, add a fan to Step 2 and increase light trap area according in Step 3
- If you find that it is taking a large number of fans to get the desired air speed, trying using a that has a higher air flow ratio (flatter fan curve)

Reviewing the following Poultry Housing Tips may prove of use when using this spreadsheet:

- Light Traps for Breeder Pullet Houses (March, 1998)
- Problems Associated with Insufficient Light Trap Area (April, 1998)
- Exhaust fan Performance Factors (March, 1999)