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Poultry Housing Tips

House Tightness Charts

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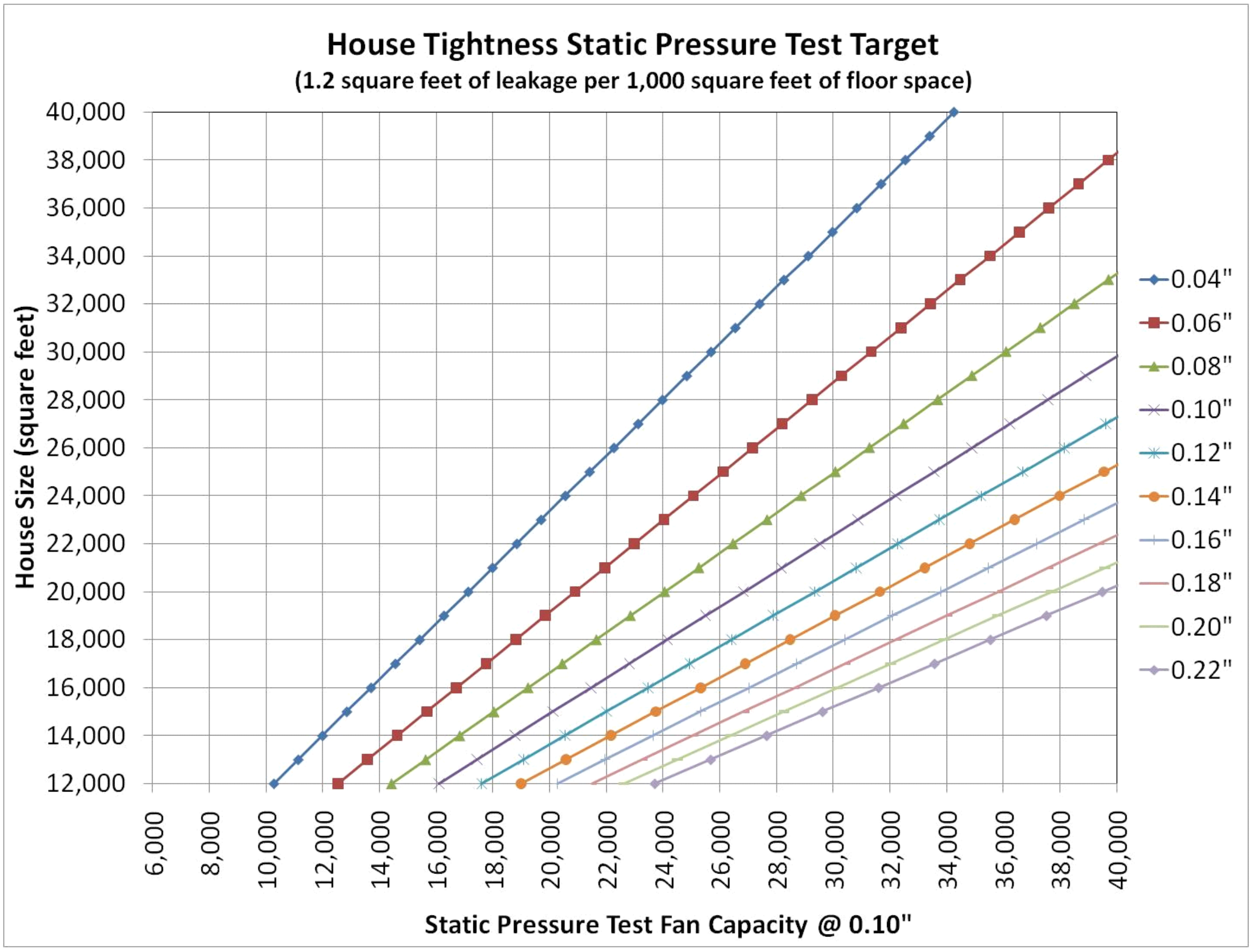

Figure 1. Minimum house tightness static pressure test target.

In order to control the environment within a poultry house it is essential that a producer not only controls how much air is entering the house, but where it is entering. For instance, during cold weather essentially no air should enter a house when the fans are off. When the fans are operating, all the air should enter through the air inlets so it can be directed along the ceiling toward the center of the house to insure it is tempered by the warm air next to the ceiling before moving down to bird level. Air entering through cracks or gaps in side wall curtains either when the fans are on or off can lead to drafts, caked litter, and excessive fuel usage. During the summer, in order to maximize bird cooling all incoming air should enter through a house's evaporative cooling pads. Air entering through cracks leads to hotter side walls, increased temperature differentials between the pads and fans, as well as poor air speed distribution; all of which can reduce weight gains and increase feed conversions. To minimize the problems associated with air leakage it is essential that poultry producers are aware of how tight their houses are so that corrective actions can be taken before bird performance suffers and/or heating costs become excessive.

How do you tell if your houses are "tight?" One of the best ways is to conduct a simple static pressure test. Traditionally a static pressure test consists of turning on a single 48" fan or two 36" fans, with all the inlets and curtains closed, then measuring the resulting static pressure. The higher the pressure, the tighter the house, and the greater the level of control you will have over the environment within your house as well as energy costs. Though using a static pressure test for determining house tightness has served the industry well over the years, there are potential weaknesses. Specifically, traditional static pressure testing doesn't take into account house size or the fact that a fan may move significantly more or less than 20,000 cfm. After all, a static pressure of 0.13" is more desirable in a 500' house than in a 300' house. Likewise a static pressure of 0.13" obtained with two 36" fans that move a total of 18,000 cfm would be superior to one obtained with a 54" cone fan that moves nearly 30,000 cfm.

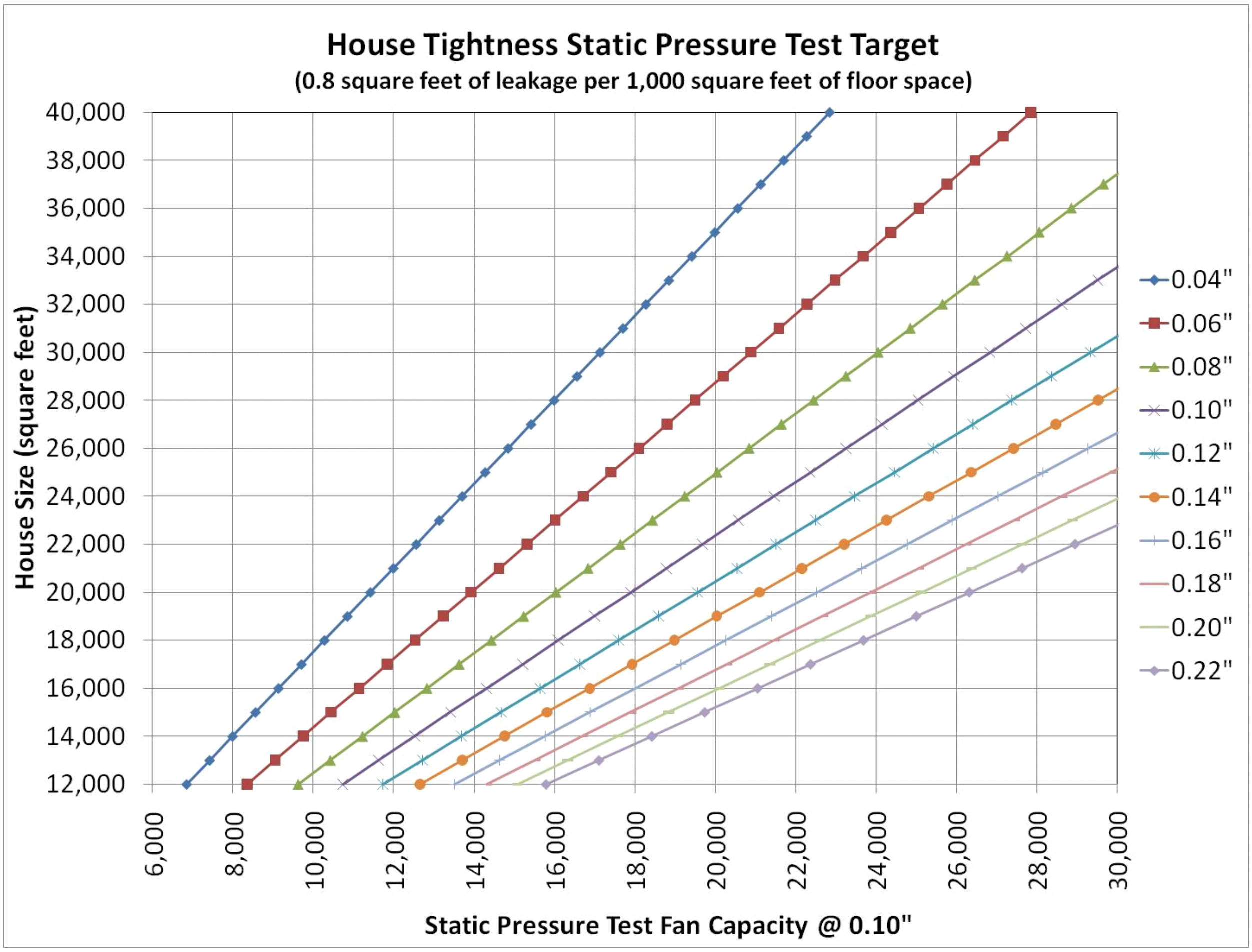

Figure 2. Moderate house tightness static pressure test target.

One way to improve the accuracy of a static pressure test is to first establish a tightness goal in terms of leakage area per 1,000 square feet, then take into account the amount of air moved by the fan used in the test. Though the maximum acceptable leakage area would likely vary from location to location, a leakage area of 1.2 square feet of leakage area per 1,000 square feet of floor space should be considered an absolute <u>minimum</u>. Below this level of tightness a producer has little control over air exchange and distribution, especially during cold weather. These houses are generally not tight enough to use air inlets effectively during cold weather and therefore typically need to be "crack-ventilated". A more acceptable level of house tightness would be 0.8 square feet of leakage per 1,000 square feet of floor space. Houses with this level of tightness are generally tight enough that air inlets can be used effectively for minimum ventilation. Ideally, houses should have approximately 0.6 square feet of leakage per 1,000 square feet of floor space or less. In houses with this level of tightness the vast majority of the air enters the house through air inlets during cold weather and the house's evaporative cooling pads during hot weather providing optimal control over the environment and energy costs throughout the year. The above levels of house tightness in perspective in a 40' X 500' house would roughly correspond to a static pressure test value of 0.06", 0.13" and 0.22" respectively, when a 20,000 cfm fan (@0.10") is used to conduct a house tightness test.

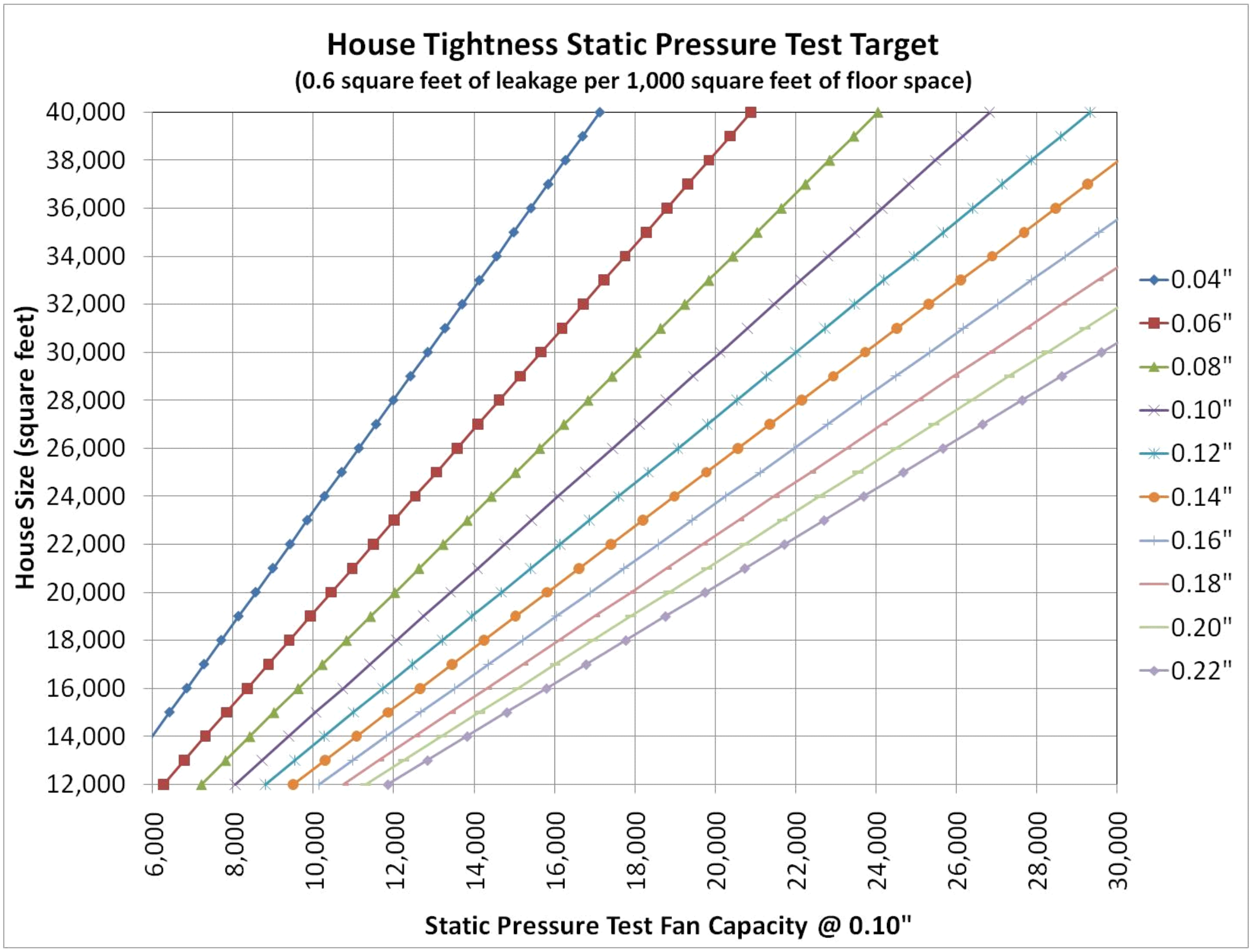

Figure 3. Ideal house tightness static pressure test target.

To make it possible to determine an equivalent standard of house tightness for all houses regardless of their size and air moving capacity of the exhaust fans used to conduct the static pressure tightest test, the above charts were developed (Figures 1, 2 and 3). In Figures 1, 2, and 3 by simply finding the intersection of the horizontal line corresponding to house size with the vertical line corresponding to the amount of air moved by the fans used to conduct the tightness test, producers can determine what level of static pressure they need to achieve to reach the desired level of house tightness.

House tightness is one, if not the most important, aspect of poultry house environmental control. Though it may be difficult for producers with older houses to reduce their leakage area from 1.2 to 0.8 square feet per 1,000 square feet of floor space or lower, the fact remains that the tighter a producer can make their houses, the more control they will have over the environment within their houses and therefore the more control they will have over bird performance as well as operating costs.

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