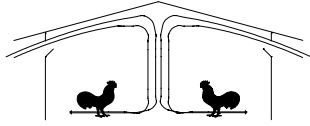




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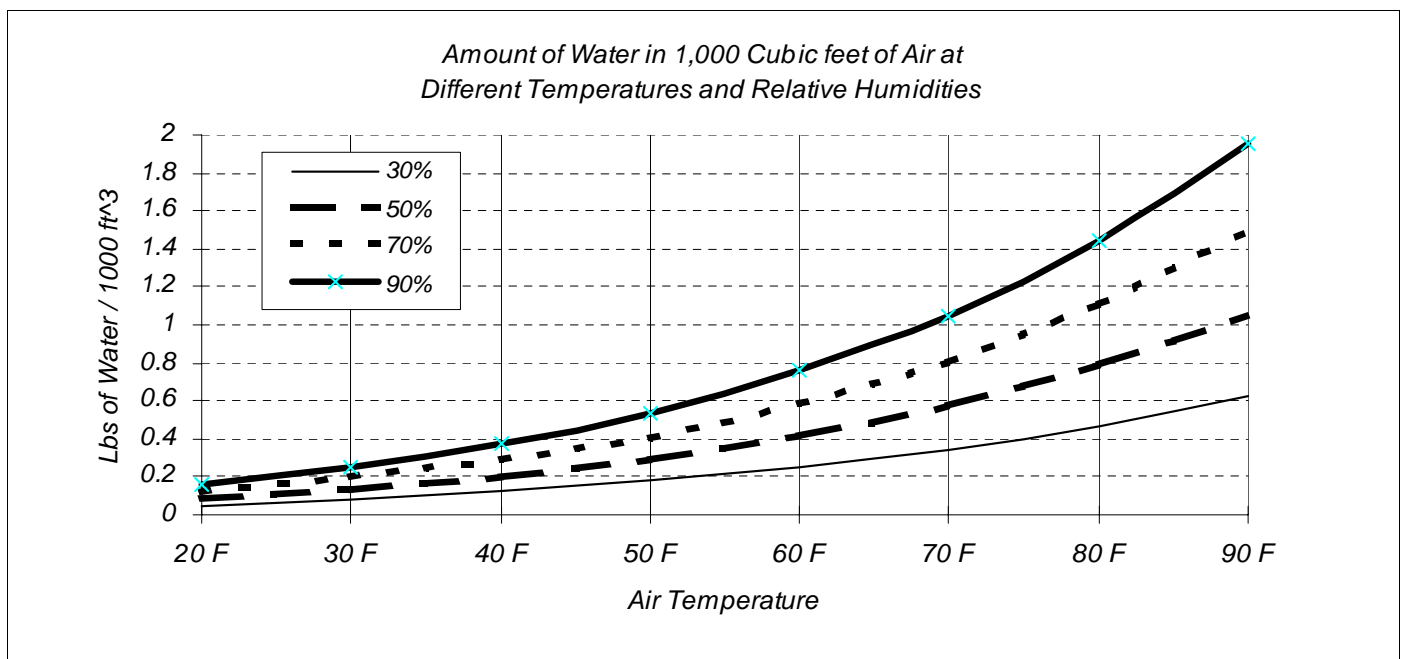


Poultry Housing Tips

Controlling Litter Moisture

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As a general rule, for every pound of feed a bird eats it will drink almost two pounds of water. For instance 24,000 four-day-old birds will eat approximately a thousand pounds of feed a day but will drink close to one ton of water a day. As birds get older, feed consumption increases dramatically and so does the amount of water they drink. For instance, 24,000 seven-week-old birds will eat over three and a half tons of feed a day and drink over eight tons of water a day. By the end of a seven-week growout, a house with 24,000 birds has consumed over 100 tons of feed and well over 200 tons of water!

Where does the water go? Actually, less than a third of this water is retained by the birds, the rest is either exhaled into the air in the form of water vapor or, to a larger extent, deposited into the litter. When a grower operates fans, the moisture-laden air in the house is replaced with drier outside air, thereby removing water from the house. The drier air that the fans bring into the house will not only pick up water that the birds are placing into the air but also remove water from the litter, keeping it drier. Of course, if a producer does not operate exhaust fans enough, water will build up in the air as well as litter leading to house sweating and litter caking.

When it comes to removing moisture from a house, it is important to know that the amount of water that air can hold varies dramatically depending on temperature. We often use the term humidity to describe how full of water the air is. For instance, if the humidity is 20%, we know that the air is only holding 20% of the water that it is capable of holding. On the other hand, if the humidity is 100%, we know that the air is holding all the water it can. So if the humidity in a house is 40%, it is capable of picking up a lot of water from the litter. Conversely, if the humidity is 90%, the air can only pick up a little water from the litter and caking is more likely to occur.

When we talk about humidity we really should be using the term **relative humidity**. This is because the amount of water the air can hold changes with temperature. For instance, 1,000 cubic feet of 40°F air can only hold less than half pound of water (eight ounces), but 1,000 cubic feet of 85°F air can hold approximately 2 pounds of water. At 150°F, 1,000 cubic feet of air can hold over eight pounds or about a gallon of water! The fact that hot air can hold more water than cold air is why we use hot air when we want to dry something off, for example, wet clothes in a clothes dryer.

As a general rule, the moisture-holding ability of air doubles for every twenty-degree rise in temperature. For instance in a 1,000 cubic feet of air at 40°F and 100% relative humidity there is less than one half pound of water. If the temperature of that air is increased twenty degrees, the moisture-holding ability of the air doubles, so it can now hold about a pound of water. Since the air is now holding only half the water it is capable of, the relative humidity now is 50%.

Let's heat the same 1,000 cubic feet of air another twenty degrees to 80°F. There is still only less than a half pound of water in the air, but now the air is capable of holding about two pounds of water. Therefore, the air is only holding 25% of the water it can, and the relative humidity is 25%.

So, can you dry a house when it is cold and rainy outside? Yes you can, because as you warm the air to the proper house temperature you are increasing its moisture-holding ability and the relative humidity of the air decreases. Since the air can now hold more water, it can remove more water from the litter, keeping the house drier.

Monitoring relative humidity is a good way to make sure that the air in your house can remove moisture from the litter. Ideally, the relative humidity should be between 55 and 65%. If the relative humidity is below 55% you can dry out the litter too much. If relative humidity is above 65% for a prolonged period, litter caking and house sweating can occur.

That warmer air holds more moisture than colder air is important to keep in mind when you are trying to keep your litter dry. For instance, let's say you had older birds and your house temperature was 70°F and the relative humidity was 65%. You started noticing that litter was starting to get a little damp and wanted to dry it out before it slicked over. You turned down your timer fan thermostats to 65°F to bring in more air. Since the temperature of the air is lower, the moisture-holding ability of the air would also decrease, resulting in the relative humidity increasing to approximately 78%. This will make it more difficult to remove water from the litter. Yes, you would bring in more air which would help to some extent, but the downside is the higher relative humidity would make it more difficult to pull the water out of the litter.

On the other hand, let's say we increased the house temperature just three degrees and left the timer fan settings the same. The relative humidity would decrease to approximately 58%, making it significantly easier to draw water out of the litter.

Another option would have been to leave the house temperature the same and to turn up the timer fan settings. This also would have worked provided that we did not let the house temperature fall. In some instances this would have meant adding heat to the house in order to maintain the desired house temperature.

The key to keeping a house dry is quality of air not quantity of air. Bringing in a lot of cold air and letting your house temperature fall does not usually do as good of a job as bringing in a moderate amount of air and warming it up.

It is important to note that using warm air to dry out litter does not always mean increased heating costs. Take advantage of the fact that as outside temperatures increase during the day that the moisture- holding ability of the air increases. So during the day when the sun is out and the air temperature is warmer, increase your timer fan settings to take advantage of the relatively drier air.

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