

SKOV International

PIG EDITION

February 2008

Humidity and minimum ventilation – essential to energy for heating purposes

The focus on house energy consumption is increasing. So far, focus has mostly been on energy for ventilation purposes. Less attention has been focused on energy consumption for heating of pig houses. However, all mechanically ventilated weaner houses have some sort of heating system.

For energy and air quality reasons, the majority of modern Danish houses are constructed as two-climate houses. In two-climate houses, each individual pen is provided with local covering under which the pigs have their resting and occupational areas. SKOV recommends the following temperature, air humidity and minimum ventilation levels in these houses. Setting air humidity at a lower level will improve the air quality in the house but at the same time require additional energy for heating. Similarly, increased minimum ventilation will improve the air quality but at the same time also result in increased heating energy consumption.

Weaner pigs 7-30kg		Air jet ventilation Two-climate							
Day no.		1	7	14	21	28	35	42	56
Set temp.	°C	24	24	23.5	22.5	21.5	20.5	20	19.5
Heat temp.	°C	24	24	23.5	22	21	20	19.5	19
Set humidity	%	60	60	65	65	70	70	75	75
Min. ventilation	m^3	3	3.5	4	4.5	5	6.5	8	10

Recommended settings for a SKOV ventilation system

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We have examined how much the set relative air humidity affects the heating energy consumption. This will vary from house to house. Insulation degree, how well the house has dried after washing and the level of water spill in the house will affect the air humidity level.

The following example is based on a two-climate section accommodating 240 weaners. StaldVent was used for the analyses. The calculations were made assuming that it was permitted to add heat only up to 30% ventilation.

The calculation was first made with the settings indicated in the above table, i.e. SKOV's recommendations. The analysis was then carried out under conditions where the humidity deviates by -15% to +15% from the recommendations. We also calculated the consequences for the energy consumption if minimum ventilation deviates from our recommendations.

Results

The calculated annual heating energy consumption is indicated in the figure below as a function of the registered air humidity.

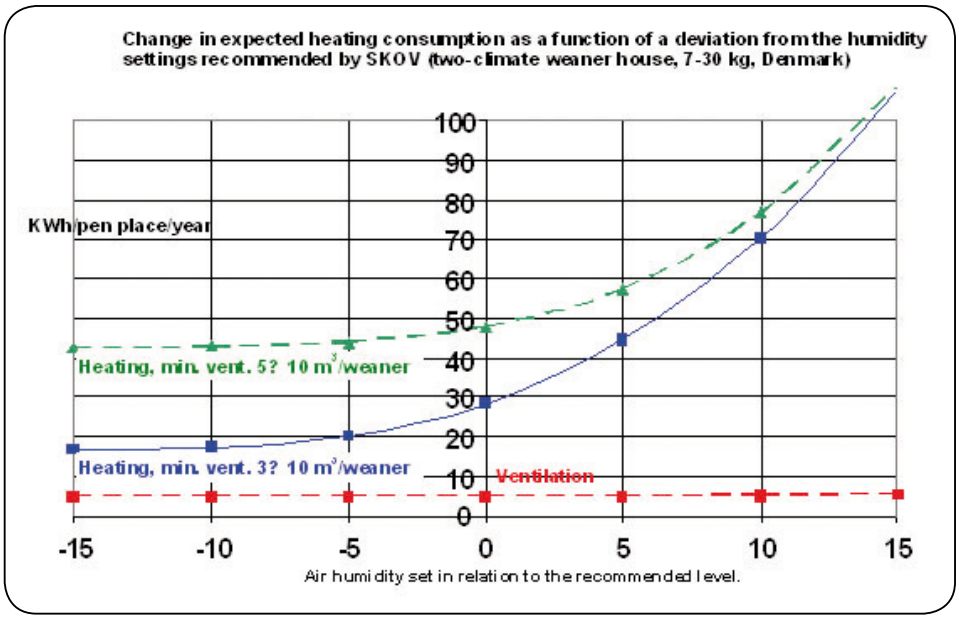
The blue curve in the figure shows a dramatic increase in the expected energy consumption if the set air humidity is lowered. If the set air humidity is 10% lower than the recommended level, the heating energy consumption will increase from 30 to 70 kWh/pen place/year, i.e. more than a doubling of the energy consumption. On the other hand, energy consumption will not be reduced significantly if the set air humidity is 10% higher than the recommended level. In this connection, consumption will drop from 30 to 18 kWh/pen place/year.

In the air humidity example, it is assumed that the set min. ventilation level corresponds to the recommended levels. The green broken curve shows the consequences if the minimum ventilation deviates from the recommended levels.

As it appears, minimum ventilation also has an important impact on heating consumption. If minimum ventilation is 5 m^3/h/weaner at the time of stocking rather than the recommended 3 m^3/h/weaner, the energy consumption will increase from 50 to 78 kWh/pen place/year.

Conclusion

Humidity and set minimum ventilation play an important role for the energy consumption in the house. The lower the relative air humidity, the higher the energy consumption per produced pig. As energy consumption is so sensitive to the air humidity set, it is also a good idea to check the humidity sensor regularly for correct indication.



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