



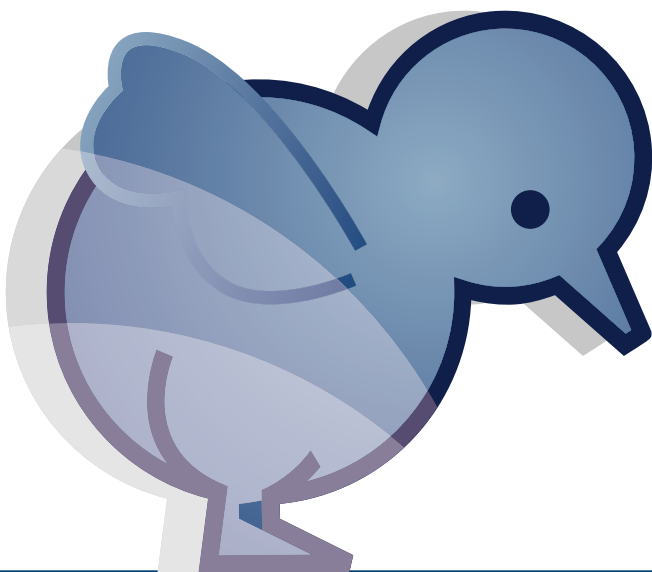
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The Climate Requirements of the Broilers

Great demands are made on the climate system in the livestock house to ensure an exact adjustment of temperature, air humidity and air velocity, among other things, in order to create optimum conditions. Birds of highly improved breeds combined with a high stocking density require a climate of precise adjustment. There is only one correct temperature – if it is not sustained, an optimum productivity cannot be attained.





Temperature

The ventilation system must ensure that the day-old chickens can maintain a body temperature which makes them seek water and feed. The optimum temperature is very critical and in case of deviations, the mortality rate will rise significantly. Later in the production cycle, the temperature must ensure the best productivity as regards weight and FCR.

Generally, we distinguish between the actual temperature to be read on the thermometer and the sensed temperature. Air humidity and air velocity have great impact on the sensed temperature.

Air humidity and air quality

If the air humidity rises, the birds sense a higher temperature even though the temperature is actually unchanged. Likewise, a low humidity can make the birds feel a lower temperature even though it has not been lowered. For instance, day-old chickens have optimum conditions at 33 °C (91 °F) with a relative air humidity of approx. 50%. The broilers would feel the same temperature at a temperature of 29°C (84 °F) and a relative air humidity of approx. 70%. A basic rule says that an increase of 1°C in temperature can be neutralized in the sensed temperature, if the relative air humidity is reduced by 5%. Even though the temperature sensed by the day-old chickens in the above example is the same, change in the temperature and humidity relation will have other consequences, e.g. for the litter which then will not have optimum conditions in the last situation with 70% air humidity.

Later, when the broilers are full-grown and prefer a temperature of approx. 20°C (68 °F), the humidity is not so decisive. The relative humidity should here merely lie between 40 and 80%.

The air quality and the litter quality are also closely connected to the air humidity. Day-old chickens should be ensured sufficient ventilation so the concentrations of noxious gases like e.g. CO₂ do not exceed the known

limit values. CO₂ is particularly critical at minimum ventilation; a ventilation level should be ensured, so the CO₂ concentration does not exceed 3000-3500 ppm. During the following one to three weeks of the production period, the ventilation must warrant the litter "a good start" so the composting process can get started and hereafter the litter can take over the function of being the primary heat source. For the rest of the production period of the broilers,

the ventilation should be maintained at a level where the content of the noxious gases in the air is limited.

Air velocity - chill effect

The air velocity has the opposite effect of the air humidity. If the air velocity is increased, the birds sense a lower temperature even though the temperature is unchanged. This phenomenon is known under the name chill effect or chill factor. For full-grown broilers with a fully developed plumage, an air velocity of 1 m/sec. (3.28 foot/sec.) will cool the birds approx. 3°C. For day-old plumed chickens, the relation is much higher - here the same air velocity of 1 m/sec. (3.28 foot/sec.) will have a sensed cooling effect of approx. 9°C.

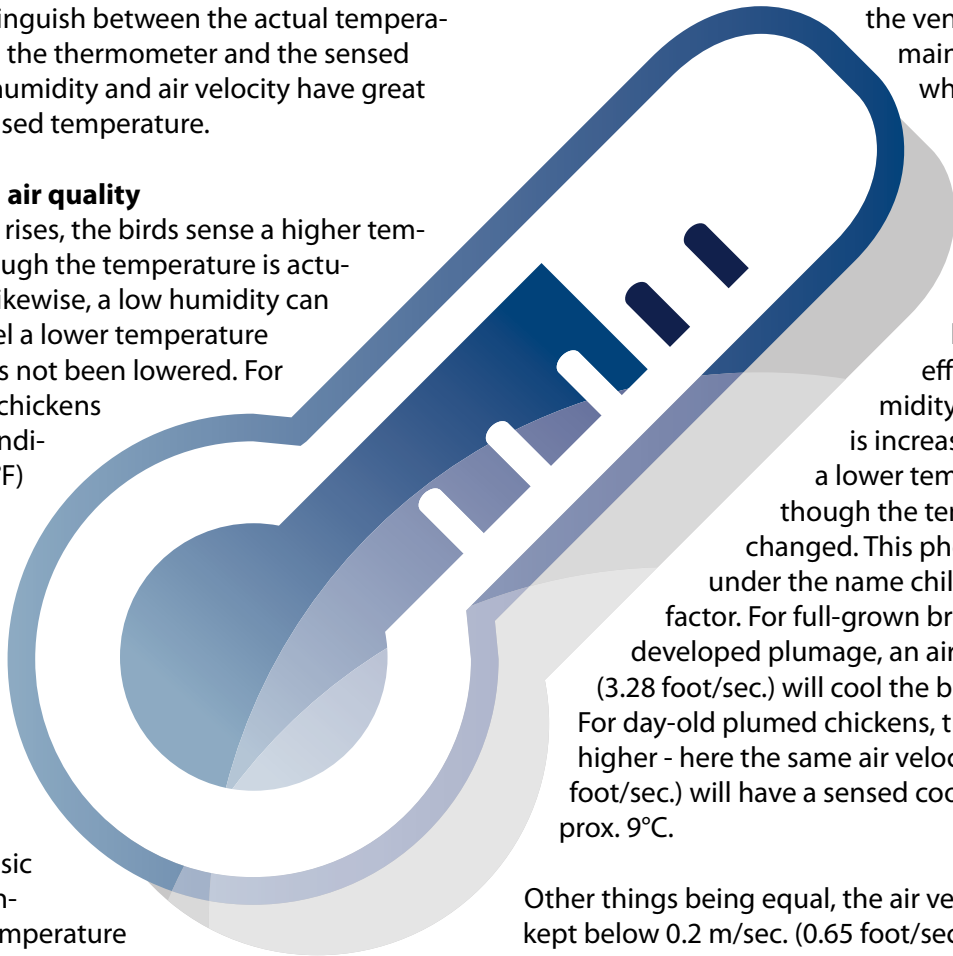
Other things being equal, the air velocity should be kept below 0.2 m/sec. (0.65 foot/sec.) during the brooding period and during cold weather conditions, so the birds are cooled and the humidity from the birds is removed from the air.

Uniformity

A uniform distribution of the broilers in the livestock house is one of the most important concepts in broiler production. A uniform distribution on the floor (the litter) should be ensured so all the birds have the same growing conditions - however with a minimum consumption of energy for heating and ventilation.

Conclusion

Does the grower have a good grasp of the above-mentioned factors - temperature, air humidity and air velocity - then he is well on the way to having a homogeneous production. However, the grower must pay attention to the fact that other factors such as light



distribution may also influence the uniformity. Bad light conditions inside the livestock house may damage the distribution of the broilers.

When choosing ventilation system, it is important to choose a principle which - with due consideration of the climatic conditions - provides good possibilities of controlling temperature, humidity and air velocity, so a homogeneous production is obtained.

When we look at all the factors as a whole (temperature, humidity, air velocity, heat supply and litter), SKOV has gained much experience under many different climatic and production conditions over the last 35 years. Based on our experience we are able to draw up our recommendations which are listed in the below table concerning temperature, humidity and minimum and maximum ventilation. It is our experience that the grower will have the best productivity and the birds will experience the best climate, if these recommendations are followed.



Recommendations regarding temperature, humidity, minimum ventilation and maximum ventilation											
Day no.	0	1	2	7	14	21	28	35	42	45	55
Temperature setpoint °C (°F)		33 (91)		31.5 (89)	28.5 (83)	26 (79)	23 (73)		19 (66)		
House heater setpoint °C (°F)		33 (91)		31.5 (89)	28 (82)	25 (77)	21.5 (71)		17 (63)		
Humidity setpoint		50		50	60	65	70		85		
Maximum ventilation		50		75	100	150	250		250		
Min. vent. - indirect heating - m ³ /h/bird (cubic foot/min./bird)	0.00 (0.00)	0.07 (0.04)	0.15 (0.09)			0.39 (0.23)				1.10 (0.65)	1.38 (0.81)
Min. vent. - direct gas combustion -m ³ /h/bird (cubic foot/min./bird)	0.10 (0.06)	0.16 (0.09)	0.17 (0.10)			0.39 (0.23)				1.10 (0.65)	1.38 (0.81)