



# SKOV International

**POULTRY EDITION**

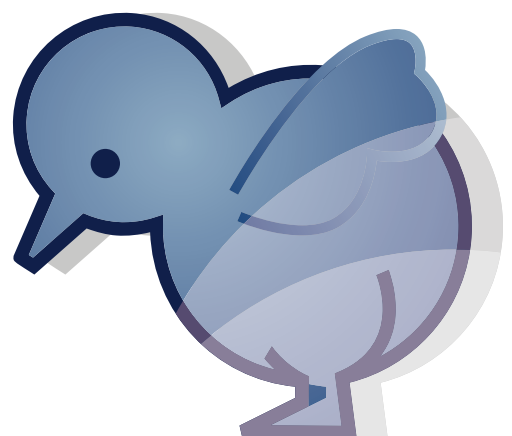
June 2008

## Climate Requirements of Broilers - the first Week

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. It is important to adjust these factors correctly throughout the entire production cycle; but it is particularly important to start the batch correctly.

Reports made by the Danish Agricultural Advisory Service "Broiler - First Week" (2002) clearly show that the heavier the broiler is on day 7, the more it weighs on the day of slaughter. So the saying "well begun is half done" also applies here.

Temperature and humidity strategy must ensure a high slaughter weight at low FCR which, when combined, provides high productivity.





### Before the Birds are stocked

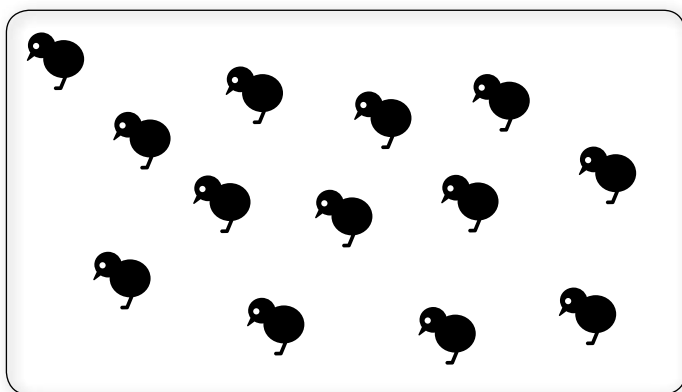
In order to provide the broilers and the litter the best start, it is important that the house has been heated for some time, if the livestock house is situated in cool/cold regions. The air temperature can be raised in a few hours; however, it can take long for the walls and floor to be heated. You can profit from heating up the livestock house to min. 25° C before the litter is spread. This way, it is possible to avoid problems with condensation later on in the batch. The temperature is increased to the right temperature the last 24 hours before stocking.

### Start of Batch - 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 productivity will decrease significantly.

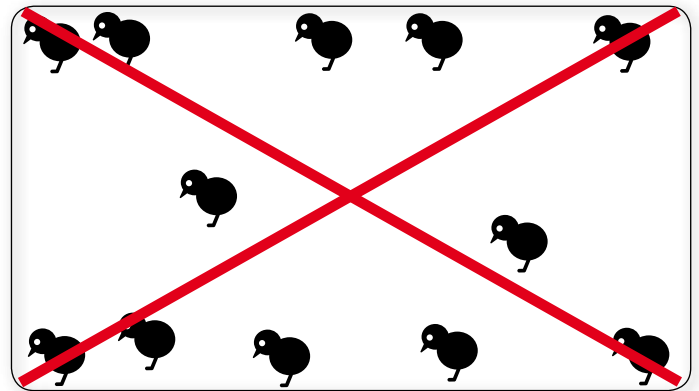
The recommendations of the hatchery or the integration for a temperature strategy are recommendations only. The broiler material will vary from breeding company to breeding company and from time to time. Likewise, the size of the day-old chickens depends on the age of the parent stock and there is a size difference between cocks and hens.

Therefore, it is important to let the broilers communicate whether there is an optimum temperature in the house. The objective is to distribute the birds evenly throughout the house as quickly as possible. In order to obtain this, it is very important to have a consistent temperature and lighting in the house (regarding lighting in the livestock house, please confer previous SKOV International "Lighting in broiler houses").



Correct temperature

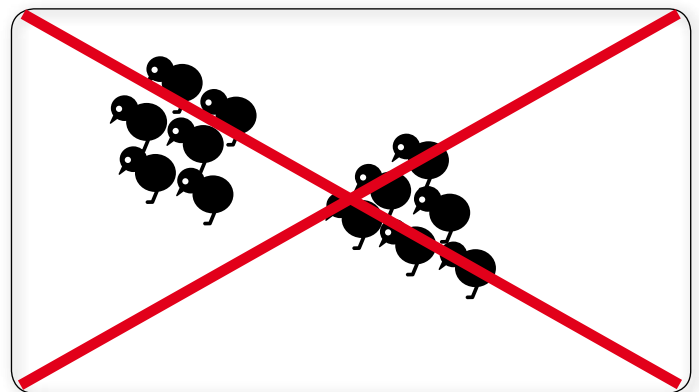
Often, the broilers are concentrated along the wall just after stocking. This is due to the broilers feeling safer here. But both too low and too high set temperature will amplify this behaviour. If a young chicken is resting and feels fit, it will typically lie in a rolled up position like a small ball with the beak in the litter.



Too high temperature

If the temperature is set too high, the broilers pant and do not lie closely together; many will move towards the wall as it is cooler there. The first sign of a young resting chicken feeling too hot is craning of the neck. When it gets even hotter, it will spread its wings a bit and stretch a leg to the side and thus increases the body surface. By this, it pursues the attempt to increase the heat emission.

As there will be differences in the breeding material (broilers), it basically is acceptable that up to 10% of the broilers demonstrate that the temperature is set to high or too low respectively.



Too low temperature

If the temperature is set to low, the broilers will get together in small groups throughout the entire house - also along the walls.

Often, it only requires small changes to change the distribution significantly. A change of 0.5° C would have a decisive consequence.

### Start of Batch - Litter

It is important to give the litter a good start and keep it relatively dry. Heating costs are relatively low when the humidity is kept down from the start when the temperature is high and the ventilation degree is low. In this situation, it is possible to reduce the air humidity quite a bit by means of an extra, small air change. Later on, when the air change is high, you have

to supply more heat in order to reduce the air humidity on a small scale. It can thus be expensive to dry the litter at a later stage as a result of wrong temperature strategy during the first weeks of the batch.

The colour of the floor is a good indicator of condensed water. A dark floor is synonymous with condensed water. The humidity in the house should be lowered and the area with bad litter should be revived. A light-coloured floor indicates that the batch has been started correctly.

### Air Velocity and Temperature

Generally speaking, air velocity can be divided into draught and cooling. Draught is a combination of low temperature and high air velocity. Cooling is high air velocity at high outside temperature. Draught has a negative impact on the production whereas cooling has a positive impact. Furthermore, it is important to note that having no plumage to protect them, air velocity seldom has a positive impact on day-old chickens.

### Air Humidity and Temperature

Day-old chickens have optimum conditions at 29° C with a relative air humidity of approx. 70%, but the broilers would feel the same temperature at a temperature of 33° C and a relative air humidity of approx. 50%. 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. This is important to keep in mind when you read recommendations from companies dealing with breeding stock.

**TABLE 3:** DRY BULB TEMPERATURES REQUIRED TO ACHIEVE TARGET APPARENT EQUIVALENT TEMPERATURES AT VARYING RELATIVE HUMIDITIES

Age (days)	Conventional		Temperature at RH%			
	Temp °C	RH% range	50	60	70	80
0	29	65-70	33.0	30.5	28.6	27.0
3	28	65-70	32.0	29.5	27.6	26.0
6	27	65-70	31.0	28.5	26.6	25.0
9	26	65-70	29.7	27.5	25.6	24.0
12	25	60-70	27.2	25.0	23.8	22.5
15	24	60-70	26.2	24.0	22.5	21.0
18	23	60-70	25.0	23.0	21.5	20.0
21	22	60-70	24.0	22.0	20.5	19.0
24	21	60-70	23.0	21.0	19.5	18.0
27	21	60-70	23.0	21.0	19.5	18.0

Source: Ross Breeder

### Air humidity and Air Quality

The air quality and the litter quality are also closely connected to the air humidity in the livestock house. Therefore, humidity measurements are a part of the regulation of the ventilation system in all contemporary climate computers. The air quality is regulated through minimum ventilation, alternatively a CO<sub>2</sub> sensor. The humidity sensor is primarily used to control the litter quality.

Day-old chickens should be ensured sufficient ventilation so the concentrations of noxious gases like e.g. CO<sub>2</sub> do not

exceed the known limit values. CO<sub>2</sub> is particularly critical at minimum ventilation; a ventilation level should be ensured, so the CO<sub>2</sub> concentration does not exceed 3000-3500 ppm.

CO<sub>2</sub> sensors are now at a quality and price level that makes them interesting to use in connection with minimum ventilation, especially in relation to the increasing energy prices.

**TABLE 22:** EFFECTS OF COMMON BROILER HOUSE AIR CONTAMINANTS

Ammonia	Can be detected by smell at 20ppm or above. >10ppm will damage the lung surface. >20ppm will increase susceptibility to respiratory diseases. >50ppm will reduce growth rate.
Carbon Dioxide	>0.35% causes Ascites. Fatal at high levels.
Carbon Monoxide	100ppm reduce oxygen binding. Fatal at high levels.
Dust	Damage to respiratory tract lining. Increased susceptibility to disease.
Humidity	Effects vary with temperature. At >29°C (84°F) and >70% relative humidity, growth will be affected.

Source: Ross Breeder

### Temperature, Air Humidity and Air Quality

To recap temperature, air humidity and air quality - it is often necessary to keep the ventilation degree at a high level in order to keep the air quality at an acceptable level. The high ventilation degree results in relatively low air humidity (40-50%) which requires a house temperature of 33-35° C when the broilers are stocked.

### Conclusion

A correct start of the batch is decisive for an optimum production cycle. It is of major importance to find the right strategy for temperature and air humidity. Especially the quality of the litter throughout the batch very much depends on how the strategy was during the first weeks of the stocked broilers. It is important not to economize on heating the first weeks. A saving at this stage can be counterproductive at a later stage when talking heating costs. Through their behaviour, the broilers communicate whether the temperature is too high, too low or correct. It is important to look at the birds and not only to look at the recommendations from the hatchery or the companies selling breeding stock. A good start-up of the batch contributes to ensuring that the productivity has been as high as possible when the birds reach slaughter weight.