



## Getting the Breeder Chick Started

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Management during the first 7 days of a breeder chick's life is critical as it has a lasting influence on health and performance for the remainder of the chick's life. The principle objective during the brooding period is to obtain the best possible early chick development and uniformity.

Excessive stress levels during the initial days post-hatch will increase susceptibility to disease, mortality and decrease growth uniformity. The chick is entirely dependent on the grower to ensure the rearing environment is comfortable and secure. The objective of this article is to encourage the critical evaluation of early chick management practices in 7 key areas:

1. Water
2. Feed
3. Temperature and humidity
4. Lighting
5. Stocking density
6. Litter
7. Ventilation

**Figure 1:** Brooding set-up for chicks with 100% paper on the floor and supplementary feeders and drinkers to ensure the chicks have a good start.



### **Water**

Clean, fresh and readily available water is critical for chicks and to ensure optimum performance. Inadequate water consumption during the first few days of life causes dehydration and may lead to problems, including poor uniformity of growth and increased mortality, later in the growing period.

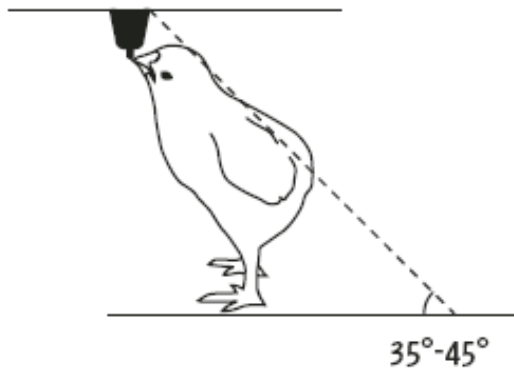
### Supplemental drinkers

The use of supplemental drinkers (e.g. water fonts and mini-drinkers) is recommended during the brooding period — even when using nipple drinkers (**Figure 1**). When supplemental water fonts or mini-drinkers are used, a minimum of one 1 gallon (4 liter) drinker per 100 chicks should be supplied for the first 3 to 7 days. The duration of supplementary drinker placement will depend on chick behavior, for example supplementary drinkers may need to stay in place for longer if chicks are slow to start. Supplementary drinkers should be filled with fresh water frequently and be cleaned out regularly to prevent the build up of bacteria and debris. They need to be well spaced between feeder trays and low enough for the chicks to drink from upon their arrival (as illustrated in **Figure 1**). Drinkers should be positioned to ensure that chicks do not have to travel more than 3.3 feet (1 meter) for access to water in the first 24 hours. Unrestricted access to a supply of fresh, good quality, clean water delivered at an appropriate temperature is essential for a good chick start. Do not present chicks with cold water as it can significantly contribute to chilling, however, water temperature should not exceed 68°F (20°C).

### Nipple drinkers

Nipple drinkers should be placed and maintained at chick eye level during the first 24–48 hours. Water pressure can be increased during the first one to three days to produce a 'droplet' of water on the nipple pin to attract the chicks. Thereafter, and normally around day three or four, the nipple drinker should be at a 45° angle, in relation to the chick's head (**Figure 2**, page 2).

**Figure 2:** Height of nipple drinkers.



### Bell-type drinkers

When using bell-type drinkers, the water level should be near the top of the drinker for the first 24–72 hours. Thereafter, reduce water depth level to 0.75 inches (19 mm) — roughly corresponding to a depth reaching the top of the index finger fingernail. Until 7 days of age, set the height of the lip of the drinker even with the chicks back. Afterwards, gradually raise drinkers until the bottom of the drinker is aligned with the chick's back (**Figure 3**). Water pressure should be low and water must flow uninterrupted. Two to 3 hours after placement, check the height of the drinkers as the chicks will flatten the litter. Adjust drinker height accordingly.

**Figure 3:** Height of bell drinkers.



The permanent watering systems should be in position from chick placement. A gradual transfer on to these systems should start from day 1 and finish around day 21. It is recommended that water quality is routinely tested for microbial load and mineral content prior to placing chicks.

### **Feed**

Until birds are 5 to 7 days old, Starter feed should be distributed into feed trays. Provide one feeder tray per 100 chicks. Avoid overfilling the trays as this will increase feed wastage. The Starter feed should be of a physically acceptable quality; use a course mash or preferably a sieved crumb. Recommendations for breeder Starter feeds can be found in the Ross Parent

Stock Nutrition Specifications (June 2007). The addition of paper, which can cover up to 100% (**Figure 4**) but not less than 25% of the litter in the brooding area, onto which feed can be directly administered, can be beneficial. The use of paper has the added advantage of preventing chicks from eating the litter material resulting in poor starts. Frequent feeding in small volumes helps stimulate the chicks.

Resting mechanical or manual feeders on top of the litter from day 1 ensuring chicks have easy access to feeders will mean that under normal conditions chicks will learn to eat from permanent feeders by the time feed trays are removed. In general this is around 5 to 7 days of age.

**Figure 4:** A typical brooding area for chicks with a sieved crumb and 100% paper cover on the floor



### **Temperature and Humidity**

The thermoregulatory system of a newly hatched chick is not fully developed until approximately 2 weeks of age. Therefore, the chick is highly dependent upon external heat sources to maintain normal body temperature.

### Litter temperature

Correct litter temperature is critical for a successful start. At 1 day of age, chicks require a temperature of 86°F (30°C) at a relative humidity of 60-70% at chick level, and a litter temperature of 82-86°F (28-30°C). If chicks are standing on litter that is <82°F (<28°C) they will be chilled through their feet. Damp litter, at any temperature, will also chill chicks and should be avoided. Place thermometers at chick level throughout the house to monitor brooding temperatures.

### Spot brooding

With spot brooding, houses should be preheated at least 24 hours before chick arrival. The use of brooders results in a more uniform heating of the litter and brooder guards can be effectively used to control early chick movement.

When using spot brooding, management of the temperature is critical. If brooder guards are in place and the temperature is not managed effectively chicks are at risk of becoming too warm as they are unable to move away from the heat source.

As chicks age (from day 3 onwards) the brooding circle can be gradually increased in size and eventually removed completely at around day 14. Reasonable variation in house temperature at this time allows chicks to regulate their body temperature by moving closer to or further away from the brooder.

### Whole house brooding

When using hot air furnaces (space heaters) for whole house brooding, it is more difficult to warm the floor to the appropriate temperature. When using this type of heating system, houses should be preheated 48 hours prior to chick arrival in order to achieve correct litter temperature. Care is required when using surrounds to ensure their height does not restrict air flow and temperature when using whole house heating systems.

### Provision of heat

Providing sufficient heat for chicks is critical. The correct provision of heat will be achieved if the output of the heat source (as measured by number of British Thermal Units [BTU\*] per unit of floor space area) being used is at the correct level. For example, in the brooding section of the house, 90 BTU/ft<sup>2</sup> (970 BTU/m<sup>2</sup>) (0.28 kW/m<sup>2</sup>) should be provided. If partial house brooding is practiced, an additional 50 BTU/ft<sup>2</sup> (540 BTU/m<sup>2</sup>) (0.16 kW/m<sup>2</sup>) should be supplied in the non-brooding portion of the house. Refer to the equipment manufacturer information to determine the BTU output of the heat source being used.

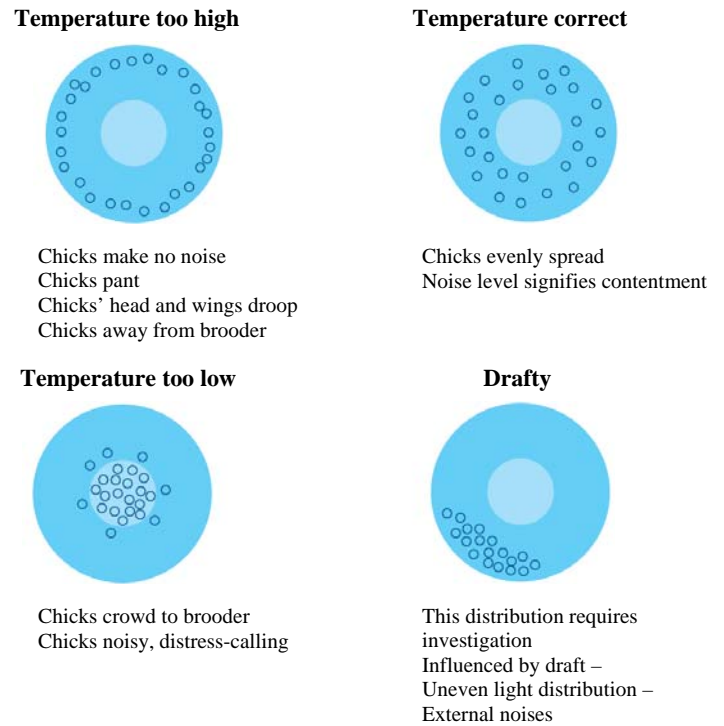
\*1 kW (kilowatt) = 3400 BTU (British Thermal Units)

### Chick behavior

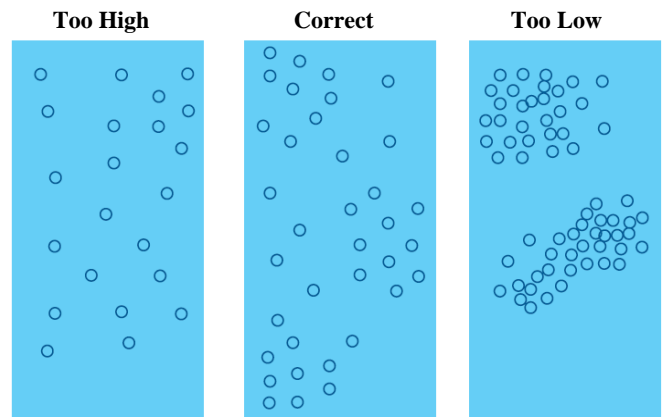
Closely monitor chick behavior during the first 24 hours after placement. After 1 to 2 hours, it will become obvious if the temperature at bird level is correct (**Figures 5 and 6**).

If behavior indicates that the temperature is incorrect then temperature settings must be checked and adjusted accordingly. Drafts must be avoided.

**Figure 5:** Typical behavior of birds under spot brooding.



**Figure 6:** Typical behavior of birds under whole house brooding.



When chicks are warm and comfortable, they feed, drink and remain spread out in small groups. If litter is wet and cold, the chicks' feet will cool rapidly and cold-stressed chicks will huddle in large groups. They may search for warmer places and, if found, will remain there and will not venture out to look for water or feed, which may lead to starve-outs.

### Relative humidity

Relative humidity (RH) is important to the health of the chick and its ability to thermo-regulate. During the first 3 days, the RH should be around 60-70 percent. If RH is <50 percent, chicks will begin to dehydrate and performance can be negatively affected. The dry bulb temperatures required to achieve the target apparent temperatures will depend on the ambient relative humidity levels recorded within the house (**Table 1**, page 4).

**Table 1:** Dry bulb temperatures required to achieve target apparent equivalent temperatures at varying relative humidities.

Age (days)	Target		Dry bulb Temperature at RH%			
			Ideal			80
Temp	RH% range	50	60	70	80	
Day Old	86 °F (30 °C)	60-70	91 °F (33 °C)	88 °F (31 °C)	84 °F (29 °C)	81 °F (27 °C)
3	82 °F (28 °C)	60-70	90 °F (32 °C)	86 °F (30 °C)	82 °F (28 °C)	79 °F (26 °C)
6	81 °F (27 °C)	60-70	88 °F (31 °C)	84 °F (29 °C)	81 °F (27 °C)	77 °F (25 °C)
9	79 °F (26 °C)	60-70	86 °F (30 °C)	82 °F (28 °C)	79 °F (26 °C)	75 °F (24 °C)
12	77 °F (25 °C)	60-70	81 °F (27 °C)	77 °F (25 °C)	75 °F (24 °C)	73 °F (23 °C)
15	75 °F (24 °C)	60-70	79 °F (26 °C)	75 °F (24 °C)	73 °F (23 °C)	70 °F (21 °C)
18	73 °F (23 °C)	60-70	77 °F (25 °C)	73 °F (23 °C)	72 °F (22 °C)	68 °F (20 °C)
21	72 °F (22 °C)	60-70	75 °F (24 °C)	72 °F (22 °C)	70 °F (21 °C)	66 °F (19 °C)
24	70 °F (21 °C)	60-70	73 °F (23 °C)	70 °F (21 °C)	68 °F (20 °C)	64 °F (18 °C)
27	68 °F (20 °C)	60-70	73 °F (23 °C)	68 °F (20 °C)	66 °F (19 °C)	63 °F (17 °C)

### Lighting

It is critical to provide correct and uniform light intensity throughout the house to ensure chicks can see to feed and drink. During the first 3 days of life, provide 23 hours of light a day with a minimum house light intensity of 1 foot candle (10 lux). Within the brooding area initial light intensities of up to 10 foot candles (100 lux) can be used to promote chick activity.

After 3 days, reduce the daily light period until a constant rearing day length of 8-12 hours is achieved at day 10 and keep light intensities between 1-2 foot candles (10-20 lux).

Provision of a longer daily light period from 4 to 10 days of age will improve early body-weight gains in operations where 7 day weights are historically low.

This will give the chick an extended eating time, helping to achieve early body-weight targets. Do not use such a lighting regime beyond 15 days of age. Another way of improving early body-weight gains is to increase the period for which the Starter feed is fed. Only consider adopting these methods after the careful evaluation of historical early body weight measurements (e.g. 7 day body weight).

### Stocking Density

Consider local welfare legislation, climate, type of housing and equipment used when making decisions regarding stocking density. Practically speaking, stocking density is a balance between economics and biological performance. Rearing chicks in overcrowded conditions does not deliver optimal biological or economical results. Initial stocking density can be up to 5 chicks per ft<sup>2</sup> (50 chicks per m<sup>2</sup>), depending upon the brooding system being used, until approximately 4 days of age. After this, space can be progressively increased and access to the whole house can be given by up to 14 days.

### Litter Management

Before chicks arrive, cover the floor to an even depth of 2-4 inches (5-10 cm) with clean, dry litter material. Where floor feeding is practiced, use a maximum litter depth of 2 inches (5 cm). Wood shavings from dried soft woods are preferred due to their ability to absorb moisture. Correct ventilation is necessary to prevent wet litter, especially during the winter period (see following section on ventilation).

Check litter material for contamination of pesticides, molds or fungi (*Aspergillus*). Pesticides can cause liver and kidney damage and can accumulate in muscles and fat. Fungi release spores into the air causing disease, stunting and mortality when inhaled by chicks.

### Ventilation

Providing good air quality for the chick is critical. Ventilation practices during the brooding period must bring in enough fresh air to provide sufficient oxygen and exhaust excess moisture and harmful gases — without chilling chicks. This practice constitutes minimum ventilation. No matter what the outside temperature, it is essential to ventilate the house for at least some minimum amount of time when chicks are present.

Do not allow cold air from outside the house to make direct contact with chicks. The key to successful minimum ventilation is creating a partial vacuum (negative pressure) so air comes through all inlets at

sufficient speed (to ensure that it is mixed with warm in-house air above the birds rather than dropping directly onto and chilling them) and through all inlets at the same speed (to ensure uniform air flow). To achieve this, the house must be air tight and have air inlets evenly distributed along the entire length of the house. If managed properly, cool outside air can then enter the house at sufficient velocity and volume to mix with warm in-house air above the chicks.

As a rule of thumb, the required minimum ventilation airflow rate for starting chicks is 0.10–0.20 CFM/chick or 1 m<sup>3</sup>/kg/hr — depending on outside temperature and internal air quality condition. Air speed at chick level should be low and kept below 30 ft/min (0.15 m/sec) to ensure a good environment and start.

### Measurement of Success

A good measure of successful chick start is crop fill. The objective is to have chicks with a full crop as soon as possible after placement. The aim is to have 80% of chicks with a full crop 8 hours after delivery and more than 95% of chicks with a full crop (**Figure 7**) 24 hours after delivery. This ensures good early uniform body weight achievement and maintenance of uniformity.

To assess crop fill, collect small samples of 30-40 chicks at 3 or 4 different places in the house to establish whether chicks are finding food and water throughout the house.

Each chick should be handled and the crop felt gently. In chicks that have found food and water, the crop will be full, soft and rounded. If the crop is full, but the original texture of the crumb is still apparent, the bird has not yet consumed enough water.

**Figure 7:** Crop fill after 24 hours. The chick on the left has a full crop while the chick on the right is empty.



### Conclusions

Management during the first week of a breeder chick's life is critical if bird health and performance is to be optimized throughout its life. There are 7 critical early chick management issues to consider:

- Water
- Feed
- Environmental temperature and humidity
- Lighting
- Stocking density
- Litter
- Ventilation

All of these factors are important for early chick development and uniformity. If these management practices are achieved, early chick development, growth and uniformity will be optimized along with subsequent breeder performance.

### KEY POINTS FOR BROODING

- Prepare, clean and disinfect houses and equipment well in advance of chick arrival.
- Ensure the house reaches the correct temperature and RH, with good air quality, at least 24 hours before chicks arrive.
- Ensure chicks have immediate access to fresh water and feed.
- Use chick behavior as an indicator of satisfactory brooding temperature.
- Replenish feed frequently during the brooding period.
- Monitor crop fill to ensure chicks are feeding and drinking, especially during the first 24 hours.
- Check and adjust feeders and drinkers daily.
- Check the chicks at regular intervals throughout the day.

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