Why monitor temperature and relative humidity (RH)?

- Information gathered when monitoring the temperature and RH in a broiler house will help to ensure that the best environment for optimum bird performance, uniformity and welfare is achieved at all stages of the flock's life.

Relationship between temperature and RH

- Making the correct decisions on the comfort of the birds can only be made if the relationship between temperature and RH is understood. The temperature being felt by the bird (the effective temperature) is dependent on the dry bulb temperature and RH.
- Variation in RH will influence effective temperature:
  - o Higher RH reduces evaporative heat loss, increasing effective temperature.
  - o Lower RH increases evaporative heat loss, decreasing effective temperature.

The table below illustrates the relationship between temperature and RH.

Body Weight g (lb)	Dry Bulb Temperature °C (°F)			
	40 RH%	50 RH%	60 RH%	70 RH%
44 (0.10)	36.0 (96.8)	33.2 (91.8)	30.8 (87.4)	29.2 (84.6)
100 (0.22)	33.7 (92.7)	31.2 (88.2)	28.9 (84.0)	27.3 (81.1)
180 (0.40)	32.5 (90.5)	29.9 (85.8)	27.7 (81.9)	26.0 (78.8)
290 (0.64)	31.3 (88.3)	28.6 (83.5)	26.7 (80.1)	25.0 (77.0)
425 (0.94)	30.2 (86.4)	27.8 (82.0)	25.7 (78.3)	24.0 (75.2)
590 (1.30)	29.0 (84.2)	26.8 (80.2)	24.8 (76.6)	23.0 (73.4)
790 (1.74)	27.7 (81.9)	25.5 (77.9)	23.6 (74.5)	21.9 (71.4)
1015 (2.24)	26.9 (80.4)	24.7 (76.5)	22.7 (72.9)	21.3 (70.3)
1260 (2.78)	25.7 (78.3)	23.5 (74.3)	21.7 (71.1)	20.2 (68.4)
>1530 (3.37)	24.8 (76.6)	22.7 (72.9)	20.7 (69.3)	19.3 (66.7)

Note: Dry bulb temperatures, at the ideal RH are colored green.

Temperature calculations based on a formula from Dr. Malcolm Mitchell (Scotland's Rural College).

This table provides general guidance; however, individual climatic conditions should be considered.

+Recent research suggests that RH is less critical for body weights between 200 g (0.44 lb) and 2,500 g (5.51 lb). Further studies are underway to assess RH effects at both lower and higher body weights.

Procedure for monitoring temperature and RH

Equipment

1. Hand held temperature / humidity meter.
2. Manual hygrometers.
3. Electronic temperature and RH sensors, these are linked to the automatic control computer.
4. Mercury minimum and maximum thermometers.

Information gathered from the electronic sensors should be monitored closely for any unexpected or unusual readings. In the event of any such readings, the cause should be investigated and the electronic and manual equipment checked and calibrated if necessary. Faulty equipment must be replaced immediately.

Step 1 Take 1 thermometer and 1 hygrometer and place at the center of the house beside the electronic sensors. Two additional thermometers should be placed half way between the center and the end walls of the house. They should be located where the birds cannot touch them and are not in the direct line of any heat sources. Calibrate the electronic sensors before the birds are placed.


Step 1

Step 2 1 manual thermometer and 1 hygrometer must be outside of the house in a shaded area away from direct sunlight to establish climatic conditions.

Step 3 All sensors should be checked at the same time every day as part of the daily routine. Minimum and maximum readings should be recorded. The manual thermometers should be reset. Hand held temperature and humidity meters can be used to provide instant temperature and humidity measurements. They are a quick and reliable method of providing additional checks inside and outside the house.

Step 3

Step 3

Interpreting results

The behavior of birds must always be considered when making decisions relating to temperature and RH.

Observe birds and determine if their behavior is correct for their age.

Enter the house and spend 5 minutes watching and listening to the birds (see table below). Pay close attention to bird behavior and activity, and house environment.

- How many birds are feeding, drinking and resting?
- What is respiration like?
- What is litter quality like?

Observation	Temperature	Action Required
Noisy Huddling Wet Litter	Cold	Check actual temperature and RH and compare to set point
		Increase temperature
		Check ventilation
Quiet Spread Out	Warm	Check actual temperature and RH and compare to set point
		Decrease temperature
		Check ventilation
Panting Wings out to the side	Warm	Check actual temperature and RH and compare to set point
		Decrease temperature
		Check ventilation
Evenly spread out Feeding and drinking	Correct	No action required

During brooding, in addition to monitoring bird behavior, the following traits should also be assessed:

- Crop fill - If chicks do not have the desired crop fill levels (i.e. if they are more than 5% below target for each age) *(See Broiler How To...Assess Crop Fill in Broilers)*.
- Vent temperature - Lower or higher than recommended (39.4°C - 40.5°C [103 - 104.9°F]) *(See Hatchery How To...Check Your Chicks Are Comfortable)*.

If targets are not achieved, check temperature and RH levels and adjust if necessary.

More Information

- Ventilation Posters:
  - **01 Minimum Ventilation for Broilers**
  - **02 Transitional Ventilation for Broilers**
  - **03 Tunnel Ventilation for Broilers**

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