

Why measure average air speed in a tunnel ventilated house?

- The speed that air moves down the length of a poultry house determines the level of cooling that the birds in the house feel by creating a wind-chill effect.
- Incorrect air speed may either cause over heating (air speed too low) or chilling (air speed too high) of the birds.
- Regular measuring and monitoring of average air speed enables the effectiveness of the ventilation system to be evaluated and helps to identify any problems that may exist.



Procedure for measuring average air speed in a tunnel ventilated house

Air speed can be measured at any time during the flock, but ideally at least once per month (for broiler breeders) or once per cycle (for broilers). Air speed should also be measured as part of a program to diagnose ventilation problems.

Equipment

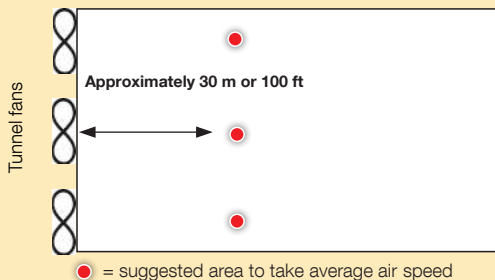
1. An air speed meter - ideally able to measure average air speed.

Procedure

Step 1 Test the house in tunnel ventilation mode while the fans are running.

Step 2 Ensure all side wall inlets are completely closed. Air should only be drawn in through the tunnel inlets and extracted through the tunnel fans.

Step 3 Air speed measurements should be taken approximately 30 m or 100 ft away from the tunnel fans in 3 or 4 locations across the width of the house. In breeder houses, air speed must also be measured from on top of slats if they are in place, as air movement is more restricted in these areas.



Step 4 Turn on the air speed meter and ensure that it is set to measure average air speed.

Step 5 Hold the air speed meter at arms-length in front of you and away from any obstructions such as feeders or nest boxes.



Step 5

Procedure for measuring average air speed in a tunnel ventilated house

Step 6 Allow the meter reading to settle, registering a constant air speed.

Step 7 Repeat Steps 1 to 6 for each location across the house. Average air speed will be calculated automatically when using the average air speed setting on the air speed meter. If no average reading is available:

- a. Record air speed at each location.
- b. Add the readings together.
- c. Divide the total by the number of locations where a reading was taken. This will give average air speed.

Note *When moving between measurement points, stop the air speed meter from taking any recordings by placing your hand over the anemometer.*

Interpreting results

The actual average air speed recorded in the house should be compared to the expected average air speed down the length of the house (see calculation below).

Example for calculating expected air speed :

In a house which is 2.1 m (7 ft) high and 14 m (46 ft) wide where 2 fans with a capacity of 35,000 cubic meters per hour (m^3 / hr) or 20,600 cubic feet per minute (ft^3 / min) are running, expected air speed is calculated as:

Metric [meters per second (m / s)] = Capacity of fans working $\div$ Cross sectional area of house

$$= \frac{3600}{(2 \times 35,000 \text{ m}^3 / \text{hr}) \div (2.1 \times 14 \text{ m})}$$

$$= 0.66 \text{ m / s}$$

Imperial (ft / min)

$$= \text{Capacity of fans working} \div \text{Cross sectional area of house}$$

$$= (2 \times 20,600 \text{ ft}^3 / \text{min}) \div (7 \text{ ft} \times 46 \text{ ft})$$

$$= 129.8 \text{ ft / min}$$

Note - When full tunnel ventilation is operating, the target air speed should be 2.5 - 3.0 m / s (492 - 590 ft / min).

Interpreting results

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If the measured average air speed is lower than that expected and / or, birds are showing signs of heat stress (panting, listlessness, drooping wings);

Re-take the average air speed reading and if it is correct the following should be considered:

- Has the calculation for determining expected air speed been done correctly; check that the values used in the calculation (fan capacity and house area) are correct.
- Are the fan louvers open completely? - This is a good indication of whether or not tunnel inlets are open wide enough.

An example of fan louvers that are completely open.



- Are the fan belts, bearings and pulleys worn?

An example of a worn fan belt.



- Is the static pressure in the house correct? (See *Ventilation How To 02 - How To...Measure House Air Tightness*).

If there are no issues in any of the areas given above, turn on another tunnel fan and / or the cooling pads or house fogging system if available. Leave the house and birds to settle and re-evaluate after 20 - 25 minutes.

If measured air speed is higher than expected and / or birds are huddling together with little movement;

Re-take the average air speed reading and if it is correct, the following should be considered:

- Has the calculation for determining expected air speed been done correctly; check that the values used in the calculation (fan capacity and house area) are correct.
- Is the static pressure in the house correct? (See *Ventilation How To 02 - How To...Measure House Air Tightness*).
- Are there too many fans running?
- Is the cool pad / fogging system working correctly? Is the water pump on for too long?

If there are no issues in any of the areas above, turn off a tunnel fan and / or the cooling pads or house fogging system if available. Leave the house and birds to settle and re-evaluate after 20 - 25 minutes.