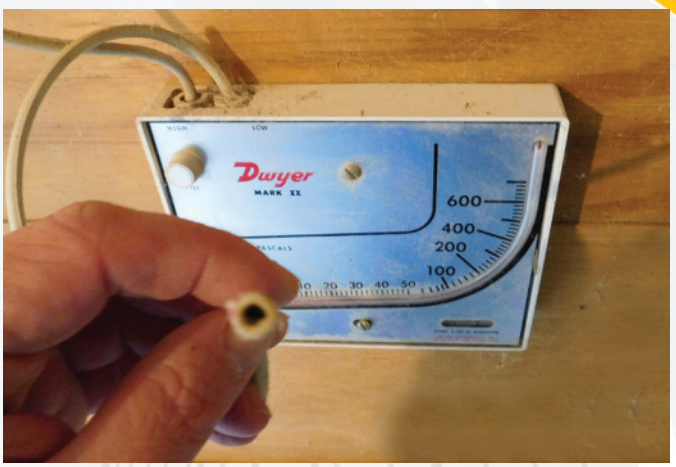
Aviagen

Ventilation
How To

01

Calibrate an in-house fluid filled pressure meter

- Routine calibration of in-house pressure meters is vital to ensure they are working correctly and that accurate measurements of house pressure can be taken.
- Achieving the correct negative in-house pressure is key to establishing correct ventilation.
- Accurate measurement of in-house pressure must therefore be possible.



Procedure

In-house pressure meters should be calibrated at the beginning of each flock before the birds are placed.

Step 1

Check that the in-house pressure meter is working correctly.

a. Use the in-built spirit level to adjust the position of the meter to ensure it is level. If the meter is not level then adjust the wall screws until it is level.

b. Disconnect the two pressure tubes (at the top) to ensure that there is no pressure differential across the pressure meter.

c. Adjust the zero knob to ensure liquid is set to zero. If there is not enough liquid in the gauge to reach zero then unscrew the fill knob completely and add more liquid (supplied by the manufacturer) to the gauge until zero is reached.

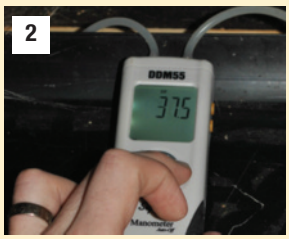
d. Visually inspect the high and low pressure tubes to check they are not blocked.

e. Check high/low tubes are positioned correctly (the low pressure tube should be placed inside the house and the high pressure tube outside the house).

f. Remember to reconnect the tubes before using. Make sure high and low tubes are connected correctly.

Step 2

While the fans are running use a hand held pressure meter to measure in-house pressure.



Step 3

Compare the reading of the hand held pressure meter with that of the in-house pressure meter. If the readings are the same then the in-house pressure meter is working correctly.

Notes

If a digital pressure meter is integrated into the environmental control panel, follow steps 2 and 3 above. If readings differ then calibrate the digital pressure meter according to the manufacturer's guidelines.

Interpreting results

If the reading on the in-house pressure meter does not match that of the hand held pressure meter (either being above or below) check the following:

- That the pipes are not blocked or that there is a hole in a pipe. If the pipe cannot be unblocked or if there is a hole, then the pipe should be replaced.
- The gauge on the in-house pressure meter is set to zero before a reading is taken. If the gauge is not at zero adjust the zero knob to increase / decrease the level of fluid in the gauge until it is at zero.
- The site glass is not cracked. Cracked site glass must be replaced.
- The meter is positioned level. If not, adjust the position of the meter using the wall screws.

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02

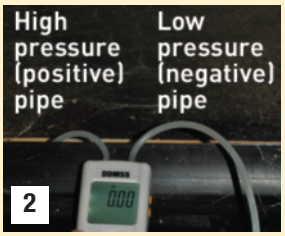
Measure house air tightness

- In-house pressure can be used as an indication of house air tightness and must be at a certain level if air is to be drawn into the house at the correct speed to adequately ventilate the house and direct the incoming air where it is to go.
- Ventilation only works effectively if the house is adequately sealed/air tight and there are no air leaks present.
- In-house pressure should be monitored routinely and regularly over time to ensure the correct pressure is maintained and to identify the presence of any air leaks that may impair ventilation.

Procedure

House air tightness is measured by recording in-house pressure. During minimum ventilation, pressure can be measured anywhere in the house and should be consistent throughout the house. Measure in-house pressure before a flock is placed or when suspected issues with ventilation occur (for example if condensation is seen, litter quality deteriorates or bird behaviour is not as expected).

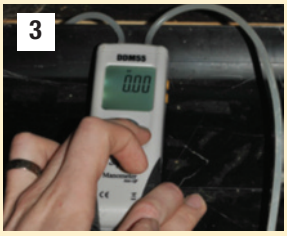
Step 1
Close all doors and inlets and have all fans switched off.



Step 2
If using a hand held pressure meter place the high pressure pipe (+ve) outside the house through an air inlet (being careful not to leave inlet open too much or to squash the pipe) and leave the low (-ve) pressure pipe inside the house.

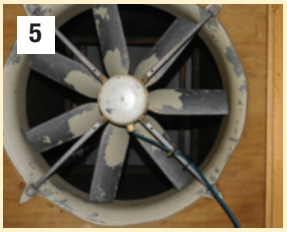
Notes
If using a mounted in-house pressure meter it should have been calibrated at the beginning of the flock.

Step 3
Ensure the pressure meter is at zero.



Step 4
Switch off the side wall inlet winch so that the inlets do not open automatically.

Step 5
Turn on either two minimum ventilation (91cm) fans or one tunnel ventilation (122cm) fan.



Step 6
Allow pressure reading to stabilise and then record the reading on the pressure meter.

Interpreting results

The pressure within the house should ideally not measure less than 37.5 Pa (0.15 inches of water column). The pressures indicated below are not operating pressures. They are to determine whether the house is sealed effectively. Higher operating pressures may need to be used during minimum ventilation.

Pressure reading	In-house pressure	Effect	Action
<37.5 Pa (0.15 inches of water column)	Inadequate	Ventilation will be affected, air speed will be low and birds will not be ventilated adequately.	Check for presence of cracks in the walls of the house, poorly fitting doors and inlets, damage to curtains or inefficient fans. Complete restorative maintenance.
37.5-42.0 Pa (0.15-0.17 inches of water column)	Adequate	Ventilation will be okay but beware of wet patches developing in the litter, condensation, birds huddling and draughts.	Check for presence of cracks in the walls of the house, poorly fitting doors and inlets, damage to curtains or inefficient fans. Complete restorative maintenance.
42.0 (0.17 inches of water column)	Ideal		NO ACTION REQUIRED.

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Measure fan capacity

03

If fan capacity is impaired ventilation will be inadequate and bird performance may be affected.

Measuring air speed through the fan or measuring fan revolutions per minute (RPM) will determine whether or not fans are working correctly and are in line with manufacturer's specifications.

Procedure for measuring fan capacity with a digital tachometer (RPM)

Fan capacity should be measured on a regular basis (at least once a flock) to ensure fans continue to work correctly. Fan capacity should also be checked when issues with ventilation occur or if there are concerns about fan function.

Step 1
Open all air inlets and doors fully.

Step 2
If fan blades are plastic a reflective sticker will need to be placed approximately 5-7cm from the tip of the blade.

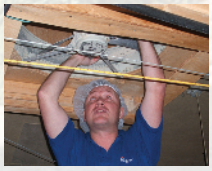
Step 3
Turn on the fan to be tested. All fans should be tested individually and at full speed.

Step 4
Holding the meter still, 0.6-1.0m away from the fan and at a slight angle, point the laser at the sticker or directly at one blade if blades are reflective/metal, until the reading on the tachometer becomes constant.

Step 5
Compare the fan RPM with the manufacturer's specifications.

Note
If the fan has reflective/metal blades the recording on the tachometer must be divided by the number of blades the fan has. The RPM should be within manufacturer's guidelines or the guidelines set by an independent testing facility.

Check bearings and motors



Worn fan belt

Loose fan belt

Procedure for measuring fan capacity with an anemometer (air speed through the fan)

Step 1
Open all air inlets and doors fully.

Step 2
Turn on the fan to be tested. All fans should be tested individually and at full speed.

Step 3
Hold the meter in front of the fan and record the **average** air speed through the fan.

Step 4
Average fan speed should be measured at nine locations across the area of measurement. Average fan speed is the average of all nine measurements or the speed obtained using the average setting (if applicable) on the air speed meter.

✗ locations for measuring fan speed

Step 5
Compare fan capacity with manufacturer's specifications.

Interpreting results

If fan capacity is below manufacturer's specifications check all air inlets and doors are open fully and re-measure fan capacity. If fan capacity is still below manufacturer's specifications fan maintenance will be required.

Areas to check if fan capacity is below specifications.

Area	What to look for	Action
Bearing and motors	Worn bearings, noise, and/or smell	Ensure bearings are properly greased or replace bearings
Fan blades	Are they smooth, or damaged/twisted	Replace any damaged blades
Fan belts	Tightness, movement and wear	Adjust belt tensioner or replace belt
Pulleys	Wear and tear, noise	Grease properly and replace if needed
Louvres and cages	Ease of movement, cleanliness, obstruction?	Grease louvre doors to ensure free movement, remove any obstructions
Wattage	Reduced fan speed/ capacity	Get a qualified electrician

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Check air inlets are open correctly for minimum ventilation

04

- Correct air inlet management is a crucial aspect of minimum ventilation.
- During minimum ventilation air inlets must be opened the right amount to ensure correct airflow into the house to ventilate the birds effectively.
- Evenly and correctly opened air inlets will create:
  – Correct direction of airflow for bird comfort and effective ventilation.
  – Even distribution of airflow throughout the house.

Procedure

Before determining whether or not air inlet openings are correct it is important to know that the pressure within the house is correct and that the house is adequately sealed. Ideally, to ensure that air is being warmed adequately the best time to test if air inlets are opened correctly is when the difference between outside and inside temperature is at its greatest (for example, during brooding when air temperature inside the house is at its hottest).

Step 1
Calculate approximate required house pressure to achieve correct air speed. Example calculation: As a guide, for every decrease in pressure of approximately 3-4 Pa incoming air will be thrown approximately 1m into the house. So for a 12m wide house the operating pressure to pull air into the centre of the house from either side should be approximately: 3-4 Pa x 6m = 18-24 Pa.

Step 2
Turn on one or two minimum ventilation (91cm) fans or the desired number of fans used for minimum ventilation settings in the house.

Step 3
Open air inlets until calculated estimated pressure is achieved (step 1 above). Be aware that it is unlikely all inlets will need to be opened. The opened inlets should be evenly distributed around the house and all inlets being used should be opened by the same amount. If installed, air direction plates should be adjusted to ensure air is directed up toward the apex of the roof.

Step 4
Complete a smoke test to determine if the air flow is correct. As long as all air inlets are opened an equal amount the smoke test can be completed on any inlet. Hold the smoke bomb approximately 5-10cm below or away from the inlet or curtain opening to allow sufficient volume of smoke to be emitted so direction of flow can be seen clearly.

Determining if air inlets are opened correctly for minimum ventilation should be completed once per flock or if there are concerns about the ventilation in the house (if litter quality deteriorates, condensation forms, or bird behaviour changes).

Interpreting results

Result	Action
1. Smoke heads up to the peak of the roof before circling back down to the floor. 	No action required: Air inlets open correctly, cold air will not fall onto the birds.
2. Smoke goes along the roof line and down the opposite side of the house. 	Action required: Air pressure is too high and air speed into the house is too fast. Either open air inlets more or reduce fan speed. Once adjustments have been made redo a smoke test and continue to adjust (inlets or fans) until situation 1 is reached. The correct combination of air inlet opening and fan capacity is essential for good ventilation.
3. Smoke falls directly to the floor. 	Action required: Air pressure is too low and air speed into the house is too slow, indicating that the air inlets are open too much or that fan speed is too low. Ventilation will be inadequate and risk of wet litter is increased. Either close air inlets more or increase fan speed and check that air direction plates (where installed) are in the correct orientation. Once adjustments have been made redo a smoke test and continue to adjust (inlets or fans) until situation 1 is reached.

Note: Final ventilation settings should be determined by bird behaviour. If bird behaviour indicates that ventilation is not correct (e.g. birds are huddling, or congregating in one particular area) ventilation settings may need to be altered. After alterations to ventilation settings have been made leave the house for 15-20 minutes and re-assess bird behaviour making further alterations if required.