Pneumonia MOT

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Better Returns Programme

Respiratory disease of cattle (more commonly known as pneumonia), is one of the most significant diseases affecting English beef producers. Cattle succumb when the disease pressure overcomes their immune system which could be caused by a range of factors such as poor nutrition or environment, stresses, eg castration/disbudding or mixing with other cattle. A large proportion of the costs of pneumonia are hidden, such as reduced liveweight gain and feed conversion efficiency. Thus, it is important for farmers to minimise the risk of the disease and treat affected animals promptly.

There are a number of areas of management that can affect the incidence of bovine respiratory disease (BRD) on a farm. This check list provides guidance on identifying problem areas.

Action	Interpretation
Animal	
Trace element profiling	
Ask vet to take blood tests for copper, cobalt, vitamin E and selenium from seven to ten month old youngstock (eg six to ten healthy animals, on grass at the end of the summer).	Deficiencies or excessive levels of trace elements can be responsible for impaired immune performance; especially vitamin E and selenium.
Body condition scoring (BCS)	
Manage dry cows and heifers to ensure correct body condition at calving, and throughout the year.	Aim for BCS 2.5-3.0 for spring-calvers and BCS 3.0 for autumn-calvers at calving. Ideally the cows should be in correct body condition six weeks before calving.
Growth rate of calves	
Weigh calves regularly to calculate growth rate.	Growth rates lower than 0.7kg/day indicate sub-optimal nutrition or health. Growth rates higher than 1.3kg/day indicate increased susceptibility to BRD. Note that fast growing double-muscled cattle tend to be more susceptible to BRD than less muscular cattle.
Environment/Housing	
Bedding	
Is the bedding clean/dry/sufficient?	The bedding should not be wet or make a noticeable squelch when a welly boot is lifted up. Supply plentiful, clean, dry bedding.
Design and dimensions	
Ensure adequate air inlet and outlet areas.	The required outlet area depends on the stocking density (kg LW/m^2), the average animal weight in kg, and the difference in heights between the inlets and the outlets. To calculate required outlet and inlet areas see calculations in Section A1.
Are any water leaks evident?	Avoid water leaks from gutters and water troughs.
Ventilation	
Ignite at least two to three smoke emitter pellets at different points within a building, not just at entrance/exit points affected by door ventilation. Measure smoke clearance times. Observe smoke clearance patterns.	Observe smoke to identify good and poor areas of ventilation within a building. The smoke should ideally travel up and out of outlet areas. Slow movement throughout the building indicates a high risk for transfer of pathogens from one affected animal to an entire group due to poor air flow. The rate of clearance crudely indicates how frequently air is being changed within a building. Smoke should clear in 30–45 seconds.
Observe general cleanliness of the building, eg cobwebs/dust etc.	Obvious cobwebs or dust build-up are a clear sign that ventilation is inadequate with insufficient air changes occurring.
Humidity	
Assess humidity by looking for signs such as rusting and stained roof structures.	Relative humidity levels below 75% are key to reducing spread of disease. Dark stains on purlins or roof sheets, and corrosion on steelwork indicates excess humidity.

Draughts	
Measure air speed at calf level at multiple points in the shed if possible, and use smoke pellets to observe smoke patterns. Observe bedding.	Ideally air speeds should not exceed 2m/s. There should be air movement but NOT draughts. Air speeds over 1m/s need to be controlled for youngstock <100kg. Air speeds over 2m/s will impact on youngstock (<300kg) growth rates in cold weather. Air should not be able to move bedding.
Stocking rates	
Measure area of building (length x width). Record number of animals in each weight range, then calculate m^2/head.	Eg 325m^2 shed area containing 50 x 400kg cattle = 6.5m^2 per head. For benchmarks see Section A2.
Pathogen	
Blood tests	
Ask the vet to blood test for IBR, BVD, RSV, PI3, *Histophilus somni, Mycoplasma bovis,* as appropriate.	Blood sampling cohorts of youngstock that are eight to fourteen months old and are unvaccinated, can reveal current herd health status for infectious diseases. By this age circulating antibodies that were passively transferred from dams via colostrum have disappeared. This means any antibodies detected represent pathogens currently encountered by the animals in the herd if homebred, or also from the herd of origin and in transit if purchased.
Faecal sampling	
Test faeces for liver fluke, enteric worms, coccidiosis, lungworm, as appropriate.	Faecal samples can identify the presence of parasitic pathogens and how large the burden may be. Some pathogens such as lungworm may represent a direct challenge to respiratory health. Others such as coccidia and liver fluke compromise immune function.

Pneumonia MOT Reference Tables

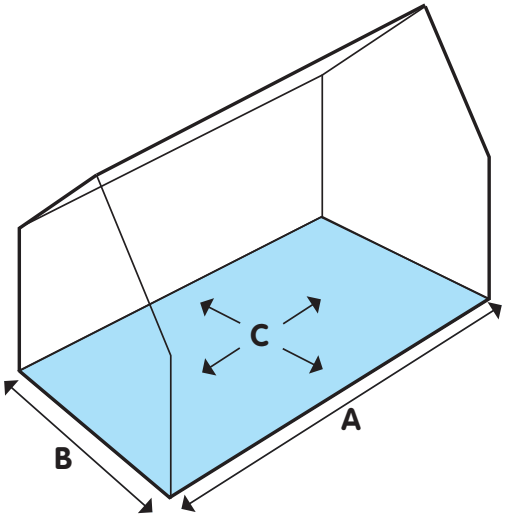
A1: Ventilation calculations

The calculations below estimate the area of outlet and inlet required in a building to ventilate naturally by the stack effect.

This occurs when an accumulation of warmer air from the body heat of the animals, is able to rise and leave a building, drawing clean fresh air in through the side inlets.

To allow this to happen, it is essential to have an adequate outlet area in the roof. If this is not big enough, heat, moisture and foul air will accumulate inside the building faster than they can leave. The resulting environment will be perfect for bacteria and viruses to survive in.

Insert your own figures in the tables below.



Step 1.

The calculations are shown for the example building:

Building length = 22.86m **[A]**	
Building width = 18.29m **[B]**	
Floor area = A x B = 418m^2 **[C]**	
Stocking density = 46 cattle **[D]** at average 400kg LW	

Where a range of animal weights occur, use an average weight. Where there are suckler cows and calves, again use an average weight but consider calves at their heaviest weight. Similarly for growing animals use the expected maximum liveweight that the building will be required to house.

Floor area per animal = 418m^2 **[C]** ÷ 46 **[D]** = 9m^2 per animal **[E]**	

Ventilation calculation key

[A] = Building length	**[D]** = Number of animals	**[G]** = Eaves to ridge height difference
[B] = Building width	**[E]** = Floor area each animal has	**[H]** = Building height factor
[C] = Floor area of the building	**[F]** = Outlet area in the roof per animal	**[I]** = Outlet area required

Step 2.

Outlet area per animal - (use Figure A1a on next page to calculate)

Read along the horizontal axis of the graph in Figure A1a to the floor area per animal **[E]** and find the line for the relevant weight of animal. Read across to the vertical axis.

For example, a floor area of 9m²/animal at 400kg average liveweight requires an outlet area in the roof per animal of 0.12m² **[F]**	

Step 3.

Eaves to ridge height difference (use A1b below to calculate or use own measurements)

The outlet area in the roof per animal **[F]** needs to be modified by the influence of the pitch of the roof, which is in effect the difference in height between the eaves height and the ridge height.

To calculate the height difference between the eaves and the ridge of a building, either make own measurements, extract the measurement from building plans, or estimate by counting reference points in the gable ends, such as rows of blocks. An alternative is to estimate the slope of the roof and use the multiplier for roof slope in Figure A1b.

Figure A1b: Multiplier to estimate roof height difference [G] from roof slope

Roof slope	Multiplier
10 degrees	0.176
12 degrees	0.213
15 degrees	0.268
17 degrees	0.306
20 degrees	0.364
22 degrees	0.404

Height difference **[G]** = roof slope multiplier x half the building width **[B]**

With a 17° pitch the eaves to ridge height difference of the example building is 0.306 x (0.5 x 18.29 **[B]**) = 2.8m **[G]**	

Step 4.

Outlet area required (use Figure A1c on next page to calculate)

Read along the horizontal axis of the graph in Figure A1c to the height difference of the building. A height difference of 2.8m (the horizontal axis of Figure A1c) corresponds to a height factor (on the vertical axis of Figure A1c) of 0.60 **[H]**

The actual outlet area required **[I]** for this example is:

Outlet per animal **[F]** x height factor **[H]** x number of animals **[D]**

Outlet area required is 0.12m² **[F]** x 0.60 **[H]** x 46 **[D]** = 3.31m² **[I]**	

Step 5.

The outlet area required is a defined value; how this area is achieved in the ridge is flexible. A common solution is to provide a continuous gap along the ridge, in which case the required gap width is the outlet area required **[I]** divided by the building length **[A]**.

In this case the required ridge gap is 3.31m² **[I]** ÷ 22.86 **[A]** = 145mm	

The inlet area, ideally split evenly across the two sidewalls is an absolute minimum of twice the outlet area and better at four times the outlet area. In this example, the inlets should be 145-290mm across each side wall. Use the lower figure for youngstock and for exposed sites.

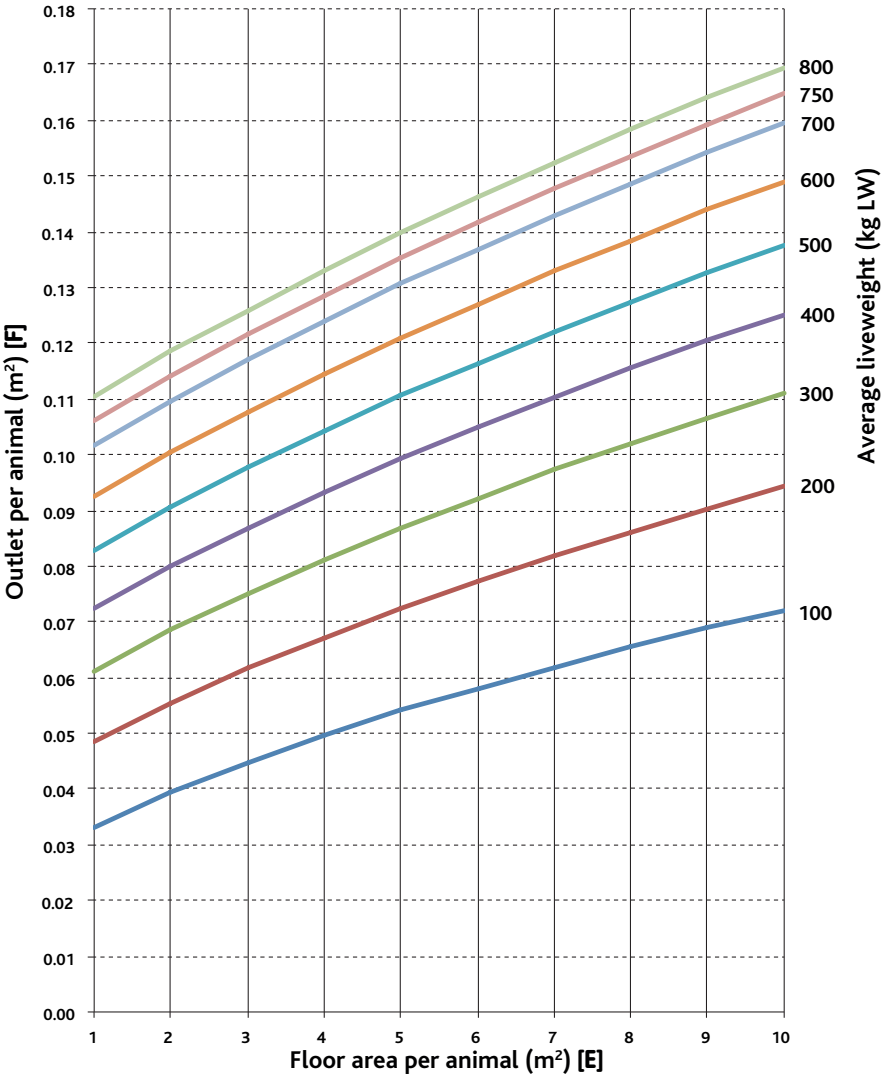


Figure A1a: Outlet area per animal [F]

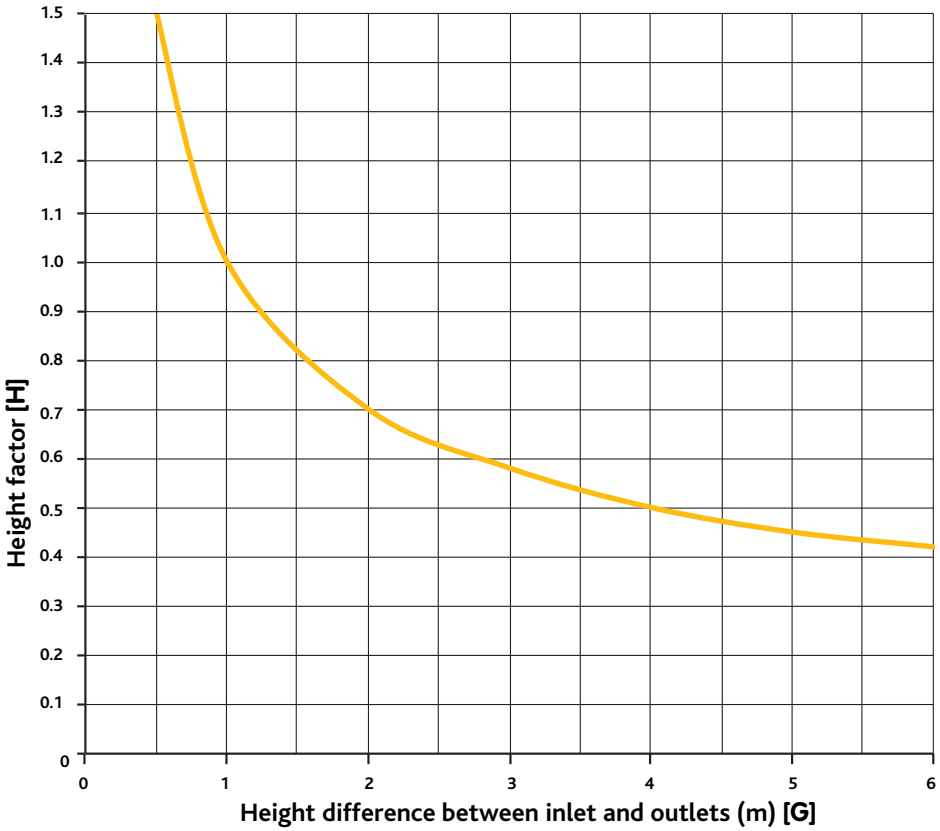


Figure A1c: Building height factor [H]

A2: Housing space allowance guidelines

The tables below provide guideline space allowances. Cattle and building type will influence the most appropriate space allowances on a particular farm.

Table A2a: Loose housing (Red Tractor Assurance Standards 2011)

	Liveweight (kg)	Solid floors (m^2/head)		Slatted floors (m^2/head)
		Bedded area	Total area (incl. feeding and loafing)	
Suckler cows	400	3.50	4.90	2.50
	500	4.25	5.85	2.75
Growing/ finishing cattle and youngstock	200	2.00	3.00	1.10
	300	2.75	3.95	1.50
	400	3.50	4.90	1.80
	500	4.25	5.85	2.10
	600	5.00	6.80	2.30

Table A2b: Cubicle dimensions (Red Tractor Assurance Standards 2011)

	Liveweight (kg)	Dimensions	
		Length (m)	Width (m)
Cows	400 - 600	2.4	1.15
	Over 600	2.5	1.2
Growing/ finishing cattle and youngstock	75 - 150	1.2	0.6
	150 - 250	1.5	0.75
	250 - 375	1.7	0.9
	Over 375	2.1	1.1

A2c: Bedded area allowances for suckler cows and calves (excluding creep area) (BS5502: Part 40*)

Cow weight (kg)	Bedded area per single cow and calf		Slatted area per single cow and calf
	Bedded (m^2)	Total (m^2)	Area (m^2)
Up to 500	3.75	5.00	2.50
500 to 600	4.05	5.50	2.75
Over 600	4.35	6.00	3.00

A2d: Bedded area allowance for group housed calves

Calf weight (kg)	Minimum area± (m^2)	Recommended# (m^2)
Under 150	1.5	2.0-4.0
150 to 200	2.0	5.0

± Source: DEFRA Code of Recommendations for Welfare of Livestock: Cattle (2006)
Source: NADIS Calf Housing. Ian Ohnstad (2013)

Table A2e: Bedded area allowances for calves in calf creep (BS5502: Part 40*)

Calf weight (kg)	Area per calf (m^2/head)
Up to 250	2.5
400	3.8

Note: It is acceptable to interpolate between 250kg and 400kg but not outside this range.

*From BS5502: Part 40 Buildings and Structures for Agriculture. Code of practice for design and construction of cattle buildings. British Standards Institution.

Notes

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