

Dairy cow housing assessment

A checklist to assess cow comfort



DairyNZ 



Ministry for Primary Industries
Manatū Ahu Matua



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This assessment tool will help to identify any cow comfort issues that may impact on welfare and production. Assessing the cows' environment is essential to well-run housing. Use this assessment guide as a pre-housed or early use check of facilities, or at any time during the housed period when cow health or production is compromised.

You will need:

- Calculator
- 8 – 10 meter measuring tape
- DairyNZ Dairy cow housing guide (recommended)
- DairyNZ Lameness scoring resource
- DairyNZ Cow cleanliness scoring resource
- Scoring sheets (see dairynz.co.nz for optional templates).

Instructions

Complete the assessment and tick when acceptable. For anything unacceptable, refer to the information section and record action(s) required. Further details can be found in the Dairy Housing Guide.

Note: Not all questions are applicable to all housing types, or all times during the day.



Farm information

Farm ID	
Housing type:	
Number of cows housed:	
What is going well?	
Is there anything you are concerned about? (e.g. dirty cows or rub marks)	
Is there anything you have observed that might be causing the problem?	
What recording & reporting systems do you have in place?	
Time of inspection:	
Time in relation to an activity (e.g. two hours after feeding):	
Point in production cycle:	<i>Dry / Lactating / Calving</i>
Current usage pattern of the facility:	

Sample size = 70 cows, unless stated otherwise. In large herds a bigger sample size should be considered.

Cows

REF	TARGET	ACCEPTABLE 	ACTION REQUIRED 								
1	All cows are active and alert.										
2	No waiting cows (waiting to eat, drink or lie down).										
3	<p>85% of cows in stalls or on designated bedded area are lying down.</p> <table border="1" data-bbox="225 689 786 958"> <tr> <td data-bbox="225 689 379 815">Number of cows lying</td> <td data-bbox="379 689 560 815"> $\frac{\text{Total Cows in Area lying area}}{\text{Total Cows in stalls}}$ </td> <td data-bbox="560 689 644 815">100</td> <td data-bbox="644 689 786 815">%</td> </tr> <tr> <td data-bbox="225 824 379 949">Number of cows lying</td> <td data-bbox="379 824 560 949"> $\frac{\text{Total number of cows in stalls}}{\text{Total number of cows in stalls}}$ </td> <td data-bbox="560 824 644 949">100</td> <td data-bbox="644 824 786 949">%</td> </tr> </table>	Number of cows lying	$\frac{\text{Total Cows in Area lying area}}{\text{Total Cows in stalls}}$	100	%	Number of cows lying	$\frac{\text{Total number of cows in stalls}}{\text{Total number of cows in stalls}}$	100	%		
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Number of cows lying	$\frac{\text{Total number of cows in stalls}}{\text{Total number of cows in stalls}}$	100	%								
4	No cows lying abnormally. (Loose housed = 'dog sitting') (Freestall systems = anything other than straight with cow's whole body on the freestall bed).										
5	No cows perching (front feet only standing in stall).										
6	No cows lying on concrete.										
7	No cows kneeling while feeding.										
8	<p>No more than 20% of cows are scored as 'dirty' based on the DNZ hygiene scoring card.</p> <table border="1" data-bbox="225 1630 772 1756"> <tr> <td data-bbox="225 1630 379 1756">Number of dirty cows</td> <td data-bbox="379 1630 560 1756"> $\frac{\text{Total Cows assessed}}{\text{Total Cows assessed}}$ </td> <td data-bbox="560 1630 644 1756">100</td> <td data-bbox="644 1630 772 1756">%</td> </tr> </table>	Number of dirty cows	$\frac{\text{Total Cows assessed}}{\text{Total Cows assessed}}$	100	%						
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REF	TARGET	ACCEPTABLE 	ACTION REQUIRED 																
9	<p>Rub marks</p> <p>a) Less than 10% of cows have rub marks, swellings or broken skin on the top of necks.</p> <table border="1" data-bbox="229 465 788 595"> <tr> <td data-bbox="229 465 389 595">Number of affected cows</td> <td data-bbox="389 465 564 595">Total Cows assessed</td> <td data-bbox="564 465 651 595">100</td> <td data-bbox="651 465 788 595">%</td> </tr> <tr> <td colspan="2"></td> <td data-bbox="564 517 651 546">=</td> <td></td> </tr> </table> <p>b) Less than 10% of cows have rub marks, swellings or broken skin on hocks.</p> <table border="1" data-bbox="229 680 788 810"> <tr> <td data-bbox="229 680 389 810">Number of affected cows</td> <td data-bbox="389 680 564 810">Total Cows assessed</td> <td data-bbox="564 680 651 810">100</td> <td data-bbox="651 680 788 810">%</td> </tr> <tr> <td colspan="2"></td> <td data-bbox="564 732 651 761">=</td> <td></td> </tr> </table>	Number of affected cows	Total Cows assessed	100	%			=		Number of affected cows	Total Cows assessed	100	%			=			
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		=																	
Number of affected cows	Total Cows assessed	100	%																
		=																	
10	Less than 15% of cows are lame.																		
11	No signs of heat stress (signs include drooling and panting).																		



Facility

REF	TARGET	ACCEPTABLE 	ACTION REQUIRED 										
12	<p>Loose housed: Minimum available space per cow is 6-8m² for integrated use with pasture and 9-11m² for wintering and long term use.</p> <table border="1" data-bbox="228 454 786 589"> <tr> <td>Length</td> <td>X</td> <td>Width</td> <td>=</td> <td>Area available to cows</td> </tr> </table> <p><i>Do not include areas that cows stand in to feed</i></p> <table border="1" data-bbox="228 633 786 768"> <tr> <td>Area available to cows</td> <td>÷</td> <td>Number of cows in group</td> <td>=</td> <td>M²/cow</td> </tr> </table>	Length	X	Width	=	Area available to cows	Area available to cows	÷	Number of cows in group	=	M ² /cow		
Length	X	Width	=	Area available to cows									
Area available to cows	÷	Number of cows in group	=	M ² /cow									
13	<p>(Freestall only) At least one stall per cow at all times.</p> <table border="1" data-bbox="228 846 786 936"> <tr> <td>Number of stalls</td> <td>≥</td> <td>Number of Cows</td> </tr> </table>	Number of stalls	≥	Number of Cows									
Number of stalls	≥	Number of Cows											
14	<p>No discomfort experienced during knee drop test. <i>Test = Drop to your knees from standing on to the lying area, repeat 2 or 3 times.</i></p>												
15	<p>Knees are dry after kneeling on the lying area for 10 seconds.</p>												
16	<p>Feed space per cow is between 70-100cm per cow.</p> <table border="1" data-bbox="228 1261 786 1395"> <tr> <td>Length of unobstructed feed barrier</td> <td>÷</td> <td>Number of cows in group</td> <td>=</td> <td>cm/cow</td> </tr> </table>	Length of unobstructed feed barrier	÷	Number of cows in group	=	cm/cow							
Length of unobstructed feed barrier	÷	Number of cows in group	=	cm/cow									
17	<p>Feed rail is mounted 20-25cm out over the feed.</p>												
18	<p>Feed table is smooth to the touch.</p>												
19	<p>Old feed is cleaned away before new feed is added.</p>												
20	<p>There are at least two water troughs per group.</p>												

REF	TARGET	ACCEPTABLE	ACTION REQUIRED										
21	<p>For the available troughs in the group there is 10 cm of trough space per cow.</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Available trough perimeter per trough</td> <td>X</td> <td>number of troughs</td> <td>=</td> <td>Total trough perimeter</td> </tr> <tr> <td>Total trough perimeter</td> <td>÷</td> <td>number of cows in group</td> <td>=</td> <td>cm of perimeter per cow</td> </tr> </table>	Available trough perimeter per trough	X	number of troughs	=	Total trough perimeter	Total trough perimeter	÷	number of cows in group	=	cm of perimeter per cow		
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Total trough perimeter	÷	number of cows in group	=	cm of perimeter per cow									
22	Water is clear to the bottom of all troughs.												
23	Trough water is not wetting any bedded area.												
24	Air smells fresh and feels breezy even in the centre of the facility.												
25	No condensation dripping from ceiling area or mould present on roof.												
26	Light is even throughout facility - enough to read by in all areas where cows are housed during daylight hours.												
27	Cows are provided with a minimum eight-hour period of darkness.												

Calving and special care cows

REF	TARGET	ACCEPTABLE	ACTION REQUIRED
28	Calving area is clean, dry and comfortable. Springers are separate from the main herd.		
29	Down cow management procedure is in place and the facility can either be accessed by a tractor or suitable equipment to manage down cows.		



Follow up information

The following information covers the priority areas if any of the assessment criteria are flagged as unacceptable. Please refer to DairyNZ Dairy Cow Housing booklet for more in-depth information. Seek expert advice if further detail is needed.

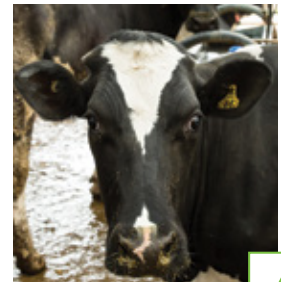
Cows

1 Cow activity

Inactive cows may be sick, lame, have insufficient space, or lack confidence on walking surfaces. Equally, cows should not spook when you walk into the facility; unsettled cows may be stressed.

2 Waiting cows

A waiting cow is an indicator that some aspect of the cow's needs such as feed, water or a comfortable lying area is being restricted.



3 Lying behaviour

If a low percentage of cows are lying down in the designated lying areas it may indicate the lying area is not clean, dry, or comfortable and stocking density is incorrect. If all cows are not getting at least eight hours of lying per day, it is recommended that you monitor lying times. In these situations, it is possible to use activity loggers that record when a cow is standing, lying and in motion.



4 Abnormal lying

Loose housed

It is unusual but a 'dog sitting' position can be observed when the lying area is very uncomfortable and cows are housed for longer periods of time.

Freestalls

If abnormal lying is seen, it indicates incorrect stall dimensions and/or design.



This table shows why cows may be lying in a particular abnormal position.

Abnormal lying positions in stalls:	Indicates:
Diagonal lying	<ul style="list-style-type: none"> • Stall length too short. • Not enough head space. This can be for head to head stalls and also stalls located too close to walls. • Obstruction in the head space that affects lying and rising lunge. • Stalls too wide. • Flexible dividers can be pushed around to suit the cows lying.
Backwards lying	Uncomfortable element in head space such as draught or sunlight.
Alternate occupancy	There is not enough head space in head-to-head stalls for cows to comfortably face one another.

Introducing cows to freestalls

Cows learning to use stalls, or that only go inside for part of the year, can take time to achieve good lying times and correct position.

Initially putting the neck rail a lot further forward than normally recommended is a good way to encourage stall use and achieve high lying percentages quickly.

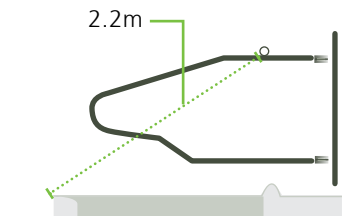
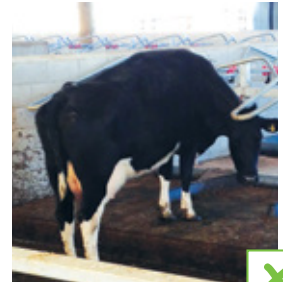
5 Perching

No cows perching is a difficult target to achieve. However, if less than 85% of cows are lying in the designated area, it is important to count how many of those standing are perching. Perching adds undue pressure on the back legs. If you see high numbers of cows perching, the neck rail is too far back or too high and it is interrupting standing with all four feet on the bed and subsequent lying in the stall.

Check the following measurements for the neck rail:

Neck rail measurements for mattress stalls	Body Weight Estimate (kg)			
	455	545	636	727
Height of neck rail above mattress surface (cm)	112	117	122	127
Horizontal distance between rear edge of neck rail and rear curb (cm)	163	168	173	178

If any of the stall dimensions do not fit within the above parameters, or you have sand beds, seek professional advice.



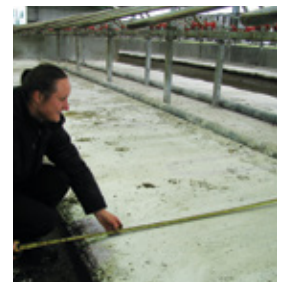
The diagonal measurement from the neck rail to the curb is usually 2.2m.

6 Lying on concrete

Lying on concrete when a bedded area is provided is unacceptable and indicates:

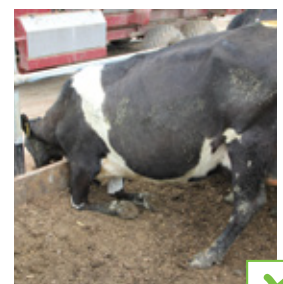
- Bedding area is not clean, dry and comfortable.
- Stalls are not the correct dimensions for the size of cow.
- There are not enough stalls for the number of cows in the facility.
- Cows are not adequately trained to use free stalls.
- There is not enough space per cow in loose housed systems.

Look for excessively dirty wet cows that may indicate lying on concrete occurred recently.



7 Kneeling whilst feeding

Kneeling cows indicate that the feed rail is too low and/or the feed is not pushed up often enough. In loose housed soft-bedded systems, the bedding material level can affect the height of the neck rail to the cow standing surface. The neck rail should be positioned between 60–70cm above the top of the feed barrier or 1.2–1.3m from hoof level. It is preferable to have an adjustable feed rail.

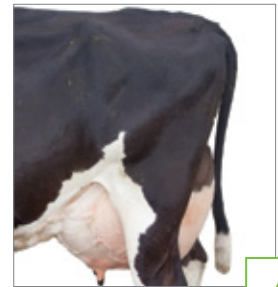


8 Cow cleanliness

Follow the instructions in the DairyNZ Cow cleanliness scoring resource.

If cows score higher than levels indicate check:

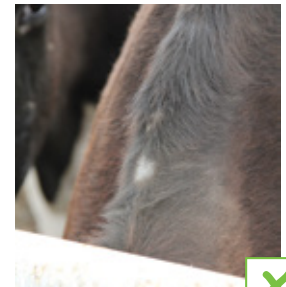
- Build-up of effluent in passageways and scraper routine
- Bedded area is clean and dry
- Stall length is too short so cows tails are lying in the passageways
- Untrimmed tail switches.



9 Rub marks and callouses

a) *Rub/callouses on the back of the neck indicate:*

- Feed rail is too low
- Feed rail is not far out enough over the feed
- Feed supply is inadequate
- Feed is not pushed up enough so cows are forced to overreach.

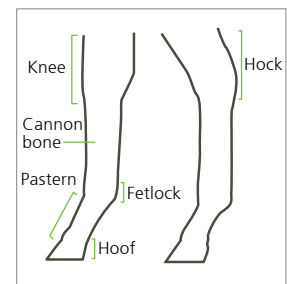


The top of the cow's neck should only just touch the rail when she reaches forward to feed. In loose housed soft-bedded systems the bedding material level can affect the height of the neck rail relative to the cow standing surface.

b) *Hock and pastern lesions indicate problems with the lying area. Check:*

- Is the bedded area uncomfortable, abrasive or has insufficient bedding?
- Are cows lying down for long periods because it is difficult or painful for them to stand up?
- Are more than 15% of the herd showing signs of lameness?

If more than 10% of the herd is affected with rub marks or hock and pastern lesions seek advice.

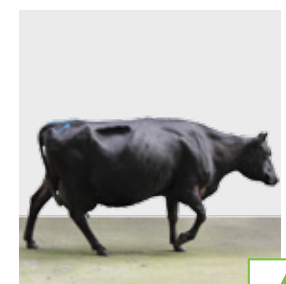


Please note if you see and rub marks on the cow's backbone/spine it may indicate inadequate stall dimensions, particularly incorrect design and height of the dividers.

10 Lameness

Cows should walk confidently and without risk of injury e.g. no sharp or broken pipework or gates. Surfaces should be anti-slip. Confident cows are observed performing normal oestrus behaviours and caudal grooming (using their tongue to groom the fold between their udder and leg).

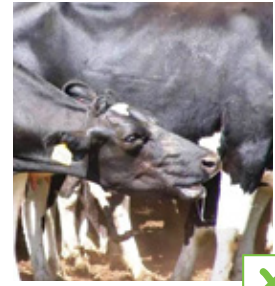
A period of adaptation is required when moving from paddocks to concrete off-paddock facilities. Lameness should recover on pasture or if pasture is at risk of pugging, a soft-bedded area. If more than 15% of the herd is showing signs of lameness, seek advice.



11 Heat stress

Cows can experience heat stress at only 21°C and 75% humidity, and cows will become uncomfortable before these temperatures are reached. Signs of heat stress are:

- Drooling and panting
- Reduced activity
- Reduced feed intake as rumen function creates heat
- Reduced milk production.



If you observe signs of heat stress in clear-roofed facilities during warmer weather, look at shade cloth options. Shade cloth must block at least 50% of solar radiation to provide correct shade provision. On still days in metal roofed housing, it will be hard to obtain enough cool air unless fans are fitted.

Facility

12 Stocking density

60% of issues within housed systems are driven by incorrect stocking densities, 40% are cow comfort specific. Ensuring correct stocking density is essential.

13 Stall allowance

Provide 1 stall per cow to achieve correct lying times. When cows are first introduced to a freestall system it is good practice to reduce stocking density, for example 80 cows for every 100 stalls.



14 Stall comfort

Knee drop test: If it is uncomfortable or painful for you, it will be the same for the cow.

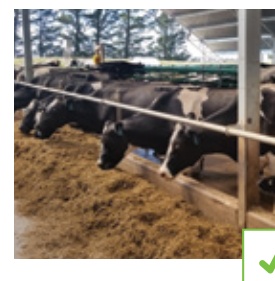
15 Dry lying area

A dry lying area is important for comfort and hygiene. Ventilation will aid drying in all facilities and incorrect stocking density in loose housed facilities can lead to over wet lying areas. The freestall bed scraping routine and the use of drying powders should be checked if stalls are wet.



16 Feed space allocation

If feed space allowance is low, body condition scores will become variable as submissive cows will not achieve correct feed intake. Ensure feed is spread along the entire length of the feed lane. Observe waiting cows after fresh feed has been delivered if feed space provision is low.



17 Feed rail height

The top of the cow's neck should only just touch the rail when she reaches forward to feed. The rail should be mounted on the feed table side (20-25cm) to allow the cow maximum reach with minimum contact to the rail.

The feed rail should be positioned between 60-70cm above the top of the feed barrier or 1.2-1.3m from hoof level. It is preferable to have an adjustable feed rail.



18 Feed table

Feed residue will collect on rough surfaces and will decay and smell, reducing the feed quality and creating hygiene issues and ultimately reducing intakes. Rough surfaces can also cause abrasion on cows' tongues.

19 Feed management

Old feed can quickly accumulate and spoil. Fresh feed won't hide the bad smell of old feed and can cause fresh feed to spoil sooner. Spoiled feed quickly becomes less palatable, reducing intakes. A well-designed feeding area with enough space per cow will minimise wastage.



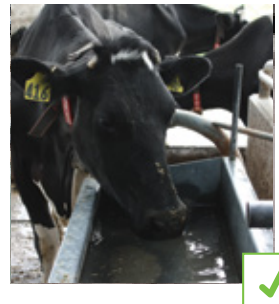
20 Water troughs

Two troughs per group provide alternative drinking points and maintain water provision when individual troughs break.

21 Trough space allocation

Providing 10cm per cow per group allows for optimum water intake and provides access to water when pressure drops or troughs break. Limited access to water can lead to restricted intakes when troughs malfunction.

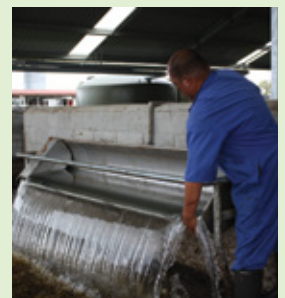
Cows drink large volumes of water; therefore the water supply rate should be at least 10-20 litres per minute so that it can be replaced quickly enough for the next cow.



Flow rate

There are a number of options to calculate the flow rate of the trough depending on the trough type:

- If you have access to the filling valve/inlet, check the flow rate by collecting water in a large measuring jug, or known volume container and time how much water is collected in 10 seconds then multiply by six for litres per minute.
- If you have a tipping trough or trough with a bung, calculate the litre capacity of the trough by emptying the trough and timing how many minutes it takes to refill. Correct the final result to litres per minute.



22 Water quality

Make sure there are no algae or foreign bodies in the trough, including food and manure. More regular cleaning will be required if this flags as an issue.

23 Trough location

Troughs situated within loose housed systems can create pugging around the water trough and be problematic when emptying or draining the troughs. Troughs in freestall facilities should not splash on to the nearest beds when cows drink or when the troughs are tipped or drained for cleaning.



24 Ventilation

Adequate ventilation is essential to achieve good air quality inside any housing facility. If air is stagnant you are likely to feel irritation in your eyes and nose and you will notice cobwebs.

25 Humidity

Check for condensation drip marks in the effluent under the length of the roof inlet, rails and stall dividers. Condensation within a building increases the moisture content which creates a successful environment for bacteria to grow. There should also be no dust pollution from bedding or feed.



Simple ventilation check 1:

Carry out a smoke test and check the flow of air movement on still days. The smoke should follow the expected path of air flow. Smoke tests can be carried out by lighting a small amount of dry material in a large metal bucket. When a good flame is achieved place damp straw or leaves over the top to create volumes of smoke.

Simple ventilation check 2:

Attach old cassette tape to a long pole and observe fluttering of the tape in different areas of the barn. Key areas to check include inlets, internal roof and areas at cow head height whilst lying. On still days or in poorly ventilated barns noticeable differences can be seen between the speed of incoming air at the inlets and the middle of the barn, which can often be stagnant.



26 Lighting

Evenly spread light reduces shadows on the ground that affects cow flow around the building especially during entry and exit of the facility.

27 Darkness

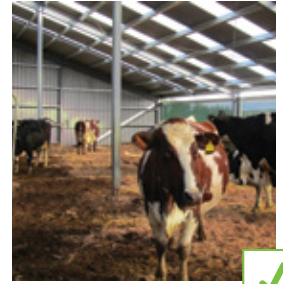
Darkness periods can include observation lighting for staff. This can be achieved by 15W dim red lights (or less) placed at 6-9 metre intervals. These will not be perceived by the cow as 'light'. Cows need virtually no light to be able to see and find their way around a housing facility.



Calving and special care cows

28 Calving area

Regardless of the system the calving area should be clean dry and comfortable. This can be achieved in a bedded loose housed facility or pens and on pasture. Planned calving in freestalls is unacceptable and an alternative calving area will be required. Separate calving and sick pens with gates rather than concrete walls are preferable. Cows are herd animals and having other cows within sight will help to decrease stress.



29 Special care cows

Lifting cows needs to be managed correctly in accordance with the Welfare Code to prevent pain or possible injury. In buildings with low roofs, solid sledges should be used to move cows to an appropriate location.



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