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ANIMAL NEEDS INDEX FOR CATTLE

ANI 35 L/2000 - cattle

December 2000

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ANI 35 L/2000 for cattle

ANI (animal needs index) **=** TGI (Tiergerechtheitsindex) = HCS (housing condition score)

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1. INTRODUCTION

The Tiergerechtheitsindex (TGI) was initially developed by H. Bartussek. Literally translated it means 'animal appropriateness index'. Its given English name is 'Animal Needs Index' (ANI). The first version of the TGI was published in an Austrian veterinary magazine (Bartussek 1985) and, subsequently in Haiger et al. (1988) where it reached a wider audience. In the early 90's, more detailed and specific versions were developed by several working groups. In 1995, the final version of the TGI (TGI 35L) became the official system for assessing housing conditions in terms of animal welfare for organic farms in Austria. TGIs were developed for calves, cattle laying hens, fattening pigs and sows. The name 'ANI' first appeared in the first English publication in 1991 (Bartussek 1991).

The ANI clearly does not assess the full range of essential needs that the respective farm animals might possess. It assesses animal housing conditions on the basis of what is known to be important for meeting the animals' needs and ensuring their well-being. Bartussek, therefore, suggested the term 'Housing Condition Score' (HCS) after discussions at the 2nd International Workshop of the Network for Animal Health and Welfare on Organic Farms, NAHWOA, in Cordoba, January 2000. The development of the TGI, the bases on which individual index parameters were chosen and first experiences of using the TGI on-farm are detailed in Bartussek (1999). The present paper is a translation of the German version of the TGI 35L for cattle, which was first published in 1996 (Bartussek 1996). It contains several amendments to the original German version, and is therefore referred to as the ANI 35L/2000. Ch. Leeb and S. Held contributed a large part of the translation.

The version of the ANI presented here is for cows, young and beef cattle from 7 months old. As all ANIs, it uses a graded point system with which five aspects ('areas of influence', 'categories') of the housing system are assessed. These five categories were chosen because of their importance for the animals' welfare. They are:

1. affording movement and locomotion ('Locomotion')
2. affording social interaction ('Social interaction')
3. type and condition of flooring ('Flooring')
4. light and air conditions ('Light and Air')
5. stockmanship ('Stockmanship')

Points are awarded within each category for several parameters. Details of the categories and their assessment parameters are given below. The total sum of all points awarded in the five categories gives the overall ANI-score. The higher the score, the better the housing conditions in terms of animal welfare. The ANI-score theoretically can take any value from –9 to +45.5. Using the overall sum of points (as an index) allows compensating for poor conditions in one category by better conditions in another. This gives the manager and stockman several opportunities to improve on the outcome of the assessment in cases where the achieved ANI-score falls below a required standard. Certain minimum requirements, however, must be fulfilled in any case.

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2. MINIMUM REQUIREMENTS

It is not the purpose of the ANI to make redundant existing animal welfare regulations on minimum space allowance for locomotion, food intake etc. It presupposes them. However, minimum standards must be defined in addition, if legal welfare standards (such as EU directives or national farm animal welfare legislation) do not specify such requirements. If those minimum requirements are not met by the housing system under assessment, then the calculated ANI-score is only valid if the deficiencies are removed within a reasonable period of time. A provisional ANI-score is awarded in the interim.

An example of legal minimum requirements for loose housing systems without cubicles is shown in Table 1 (from welfare legislation of the Austrian province of Styria 1996).

Table 1: Minimum standards for loose housing systems without cubicles (Styrian regulation 1996)

category	fully slatted stall/cubicles [m²/cow]	one area pen [m²/cow]	loose (group) housing without cubicles		width of space at feeder [m/cow]
			lying area [m²/cow)	width of activity, defecating, feeding area [m]	
heifers/beef cattle					
up to 350 kg	2.2	3.0	1.8	1.8	0.54
up to 500 kg	2.5	5.0	2.2	2.0	0.60
over 500 kg	2.7	5.0	2.5	2.0	0.70
dairy cows		5.0	3.0	2.2	0.75

3. METHOD

An initial ANI-assessment on-farm takes no longer than 30-90 min (average: 44 min) if carried out by an experienced assessor and if all relevant documentation such as a buildings plan or health records is available. This is the result of practical trials of the ANI on Austrian farms since 1995. Follow-up assessments of the same farm were found to take between 10 and 35 min. The key to reliable application of the ANI on-farm is its repeatability or inter-assessor reliability. To this end care must be taken to ensure that the qualitative parameters and their grading are defined as precisely as possible. Definitions given within this paper might not meet this requirement yet. Refining and re-defining the qualitative parameters and the way in which they are graded is an on-going process, and a permanent task for organisations and individuals using the ANI in farm assessments. At the same time assessors must be trained in the standardized application of these definitions. Regular meetings of the assessing personnel should ensure refinement and standardization of the qualitative parameters within organisations.

Separate ANI-assessments are necessary for all different housing systems on one farm. Assessments should take place in the least favourable season (late winter for cattle). In a herd or housing system, in which conditions vary greatly for different individuals, the conditions of the 25% worst affected animals are to be used for the assessment rather than the group average. This guarantees that the welfare requirements of all individuals within the housing system are addressed.

The core of the ANI consist of seven sheets to be filled in by the assessor during his or her farm visit. Sheets1-5 are for the five assessment categories mentioned above, Sheet 6 is a summary sheet for calculating the overall ANI-score, and Sheet 7 is for a summarized description of the farm. The complete ANI comprising all seven sheets and footnotes is given in the Appendix.

Several of the parameters in the assessment categories refer to Animal Weight Units or AWUs where one AWU is the equivalent of 500kg live body weight. It is thus necessary to work out the total AWU of animals to be housed in the system to be assessed. This should be done on the basis of the average maximum number of animals kept in the unit, rather than on the basis of the current number.

4. THE ASSESSMENT SHEETS

This section gives some background and detail on the parameters used in Sheets 1-5. All sheets including footnotes with additional explanations and definition can be found in the Appendix.

4.1 Sheet 1 – Locomotion

Sheet 1 assesses how much opportunity for locomotion is afforded by the housing system under consideration. This depends not only on the actual total space allowance, but also on some more qualitative parameters. There are six parameters to be assessed (columns a)-f)). Within the columns of Sheet 1, the opportunity for the animals to move and expresss locomotory behaviour according to their behavioural needs are assessed. Columns a) and b) apply only to loose housing systems, columns c) and d) to tether systems and cloumns e) and f) to units where the cattle have access to outdoor yards or pasture. Table 2 shows the parameters to be used in the assessment of the category 'Locomotion'.

Table 2   Assessment table for 'Locomotion' (Sheet 1)

column	a)				b)	c)	d)	e)	f)
	loose housing systems					tether systems		outdoor areas	
points	space allowance ('available floor area') [m²/AWU]				lying down, lying & rising	stall size and boundaries	movement of tether [m]	(yards or pasture)	
	dehorned dairy cows	horned dairy cows	suckler herds	young stock, beef cattle				total days/year	pasture days/year
3.0	≥ 8	≥ 9	≥ 7.5	≥ 6	comfort-able			≥ 270	
2.5	≥ 7	≥ 8	≥ 6.5	≥ 5				≥ 230	
2.0	≥ 6	≥ 7	≥ 5.5	≥ 4	medium			≥ 180	
1.5	≥ 5	≥ 6	≥ 4.5	≥ 3				≥ 120	alp. past. ≥ 120
1.0			≥ 4.0	≥ 2.5		comfort-able	≥ 0.6/0.4	≥ 50	≥ 50
0.5					restricted	medium	≥ 0.4/0.3		≥ 30
0	< 5	< 6	< 4.0	< 2.5	very restricted	restrictive	< 0.4/0.3		

4.1.1 Column a) – space allowance (m²/AWU) in loose housing systems

The total floor area available to all animals at any one time is to be calculated and divided by the total AWUs. 'Available area' refers to any floor area that allows the animals to stand up and turn around without any restriction to their movement. If feeding troughs are accessible at all times, an area of 0.7 m multiplied by the trough length can be added to the total space allowance. Only half of the floor area of cubicles can be included as the animals' movements are restricted in cubicles. For calculating AWUs for suckler herds, young stock and beef cattle one should use the average weight of the animals over the whole period they occupy the housing unit under assessment. Higher densities caused by increased body weights at the end of each period are balanced out by lower densities at the beginning. However, maximum densities must never exceed legal requirements or other welfare standards.

The four sub-columns of a) refer to the four types of cattle for whom housing may have to be assessed: dehorned cows, horned cows, suckler herds (cows and their offspring) and young stock, beef

cattle. However, only one score is to be assigned to column a) because one ANI is assigned to each housing or husbandry system within one farm. If, for example, a farm comprised dairy cows and young beef cattle, then two complete sets of Sheets 1-5 (incl. two 'locomotion' sheets (Sheet 1)) would have to be filled in: one for the dairy cows and one for the beef herd.

4.1.2 Column b) - lying down/rising

The ease with which cattle can lie down and rise from a lying position is prejudged to always be greater in loose housing than in tether systems.

Deep litter systems and other systems without cubicles are to be graded as 'comfortable' unless behavioural restrictions are apparent. No side of the lying area must be less than 3 m wide or long for dairy cows if this area is to be judged as 'comfortable'. Smaller dimensions may be acceptable for young stock and beef cattle depending on body size.

For cubicle systems, the size of the cubicle relative to body size as well as the design of the cubicle partitions are of importance. The largest 25% of animals are to be used in the assessment. Correct assignment of ANI-points has to be based on close observation of the animals. The following criteria are to be used:

- presence of abnormal lying down/rising behaviours, low and repetitive head swinging, hind quarters extending beyond cubicle, rising or resting in horse-like sitting position, rocking back or forth to get up;
- condition of the integument; especially important are body parts that are in frequent contact with cubicle partitions or other bars (e.g. coxal tuberosity, nape of the neck, withers).

The lying area is to be assessed as 'medium' if only some of the largest animals are restricted in their movements, or if the majority is affected only to a small degree.

Figure 1 gives the definitions for comfortable cubicles to be used in table 2.

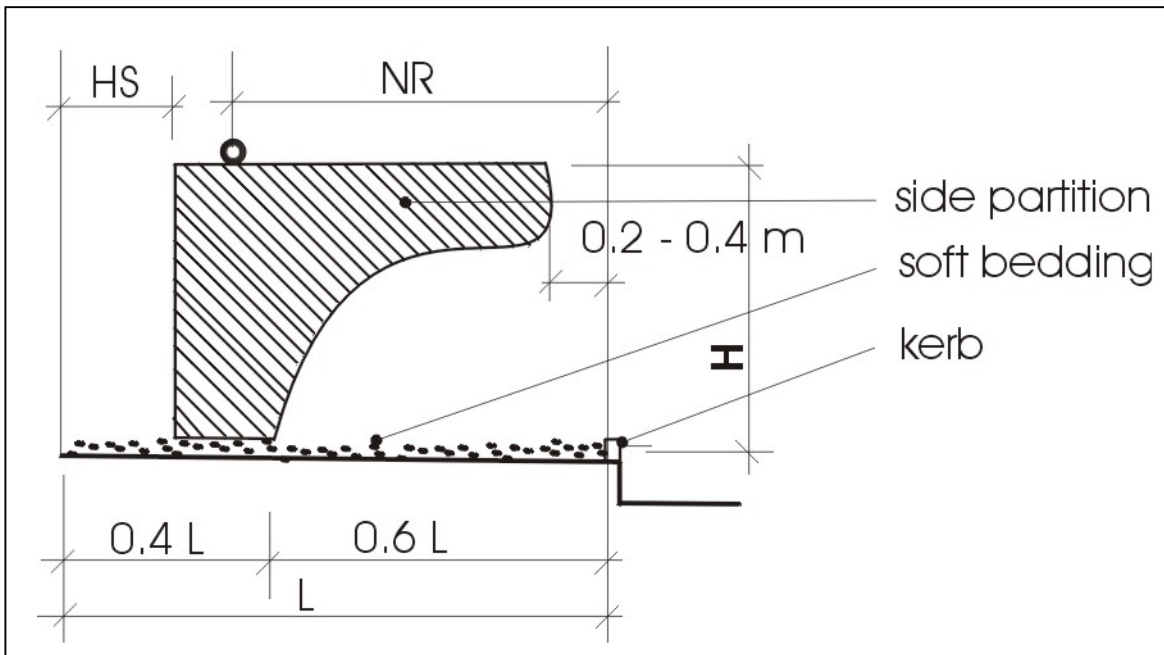Fig. 1: Definition of cubicles: length L, height H, head space (HS), position of neck rail (NR); hatched = area of side partition; base must provide soft bedding; back end of base must be a kerb or rounded bedding board; side partition must end at least 0.2 m better 0.4 m before kerb and must provide an open zone for freedom of pelvis and hindquarters to prevent injury to spine, hips, ribs and hindlegs

Table 3: minimum measurements for comfortable cubicles for 600/700kg cows in [m] (CW = cubicle adjacent to wall, CH = head to head cubicles)

breed, weight [kg]	length of cubicle L		height of cubicle H	available space for head HS	position of neck rail NR	width of cubicle
	CW	CH				
Simmental						
600	2.44	2.11	1.10	0.39	1.57	1.19
700	2.52	2.17	1.14	0.40	1.62	1.22
Brown Swiss						
600	2.50	2.16	1.14	0.40	1.60	1.23
700	2.55	2.20	1.16	0.41	1.64	1.25
Holst. Frisian						
600	2.56	2.21	1.16	0.41	1.65	1.25
700	2.62	2.27	1.17	0.41	1.70	1.26

4.1.3 Column c) – tether systems

Tether systems have to be assessed as 'restrictive' if the following criteria apply:
- high and rigid trough walls;
- short and narrow stalls;
- grid or sharp-edged kerb at the back of the stall;
- electric cow trainer.

For 'medium' the following applies:
- one of the criteria for 'comfortable' not met;
- stalls, in which access to the trough is blocked for part of the time, have to be more or equal to 0.95 times body length (BL; shortest distance between shoulder joint and ischial tuberosity) plus 0.58 m long, and 0.87 times weight at withers (HW) high.

For 'comfortable', the following criteria apply:
- the trough wall facing the cubicle has to be made of flexible rubber and must be no more 0.32 m high (from floor of stall);
- stalls, in which access to the trough is available at all times, have to be more or equal to 0.95 times BL plus 0.3 m long, and 0.9 times HW high.

4.1.4 Column d) – movement of the tether

Tethers should facilitate normal rising, standing, lying down and lying behaviours as well as grooming behaviours and social interactions with neighbours. Measurements in the rows of column c) refer to unrestricted movements sideways and back and forth at the point where the tether attaches to the neck. If an electronic cow trainer is used, no points are to be awarded in this column.

4.1.5 Column e) – outdoor areas (yards or pasture)

Only outdoor areas that provide 5m²/AWU or more are to be included here (3 m²/AWU for loose housing if available to all animals for 24h a day). No points can be awarded for outdoor areas, which are smaller than 5 or 3 m²/AWU, respectively. Such smaller outdoor areas can be added to the total space available for locomotion (column a)) if they are part of a loose housing system and freely accessible to the animals at all times. However, points can be awarded in column e), if the animals get access to these smaller outdoor areas in groups that are small enough to guarantee at least 5m²/AWU for a minimum of 1h per day per group.

4.1.6 Column f) – pasture and alpine pasture

Locomotion on pasture is judged to be more beneficial to the animals than exercise in outdoor yards. Access to pasture is therefore to be assessed separately in column e), and points from column f) are to be added to points from column e). For alpine pasture, 1.5 points are assigned, irrespective of number of days (other rows in this column refer to non-alpine pasture).

4.2 Sheet 2 – Social interaction

Table 4   Assessment table for 'Social interaction' (Sheet 2)

column	a)				b)	c)	d)	e)
	loose housing systems space allowance ('available floor area') [m²/AWU]						outdoor areas (yards or pasture)	
points	de-horned dairy cows	horned dairy cows	suck-ler herds	young stock, beef cattle	herd structure in loose housing and tether systems	management of young	total days/ year	pas-ture days/ year
3.0	≥ 8	≥ 8	≥ 7.5	≥ 6				
2.5	≥ 7	≥ 7	≥ 6.5	≥ 5			≥ 270	
2.0	≥ 6	≥ 6	≥ 5.5	≥ 4	family herd		≥ 230	
1.5	≥ 5		≥ 4.5	≥ 3	herd without bull		≥ 180	alp. past. ≥ 120
1.0			≥ 4.0	≥ 2.5	stable age or pro-duction groups	own young and constant visual contact to herd	≥ 120	≥ 50
0.5	tether systems					own young in separate building	≥ 50	≥ 30
0	< 5	< 6	< 4.0	< 2.5	tether systems	partial buying-in		
-0.5					frequent change of stall allocation (tether systems) or frequent regroup-ing (loose/group housing systems)	commonly buying-in, young in separate building and/or frequent integration of individ-ual animals into loosely housed groups		

4.2.1 Column a) - space allowance

The same criteria apply as in 4.1.1 ('Locomotion' Sheet) except that 100% of the floor area are taken into account. Cubicle partitions may restrict social contact during resting. However, this social restriction is balanced out by providing subdominant animals with the opportunity to avoid and escape from aggres-sive dominants.

4.2.2 Column b) - herd structure

'Family herds' consisting of suckler cows with male and female calves, heifers and steers and inte-grated bulls are to be considered optimal as they reflect the natural herd structure of cattle. 'Herd without bulls' refers to family herds without bulls as well as to dairy herds with the heifers remaining after wean-ing to be integrated into the herd.

4.2.3 Column c) - management of young

The highest score is to be awarded to systems, in which the calves born in the herd ('own') have con-tinuous visual contact to the herd, or in which they are separated from the herd only during the summer months when out on pasture. Regular buying-in of 10-50% of stock is to be assessed as 'partial buying-in' (0 points). Over 50% of stock bought in should be considered as commonly buying-in. Other replacement regimes or calf management systems have to be assessed according to the rows of column c). In this, it has to be borne in mind that continuous and unrestricted contact between the own offspring and the herd

is to be judged as optimal. The higher the percentage of new animals regularly introduced into the herd, and the more frequent regrouping and disturbance of the herd structure, the lower should be the score awarded in column c). Column c) does not apply to (receives no score for) specialized rearing units for heifers or beef cattle (fattening stock) without any own young, except where re-grouping is very frequent, in which case a negative score of –0.5 points has to be awarded.

4.2.4 Column d), e) - outdoor areas

The same criteria apply as in 4.1.4 ('Locomotion' Sheet).

4.3 Sheet 3 - Flooring

Table 5   Assessment table for 'Flooring' (Sheet 3)

column	a)	b)	c)	d)	e)	f)
	lying area			activity areas, passage ways (in tether systems only if to and from outdoor areas)	outdoor yards	alp. past. & pasture
points	softness	cleanliness	slipperiness			
2.5	≥ 60 mm straw					
2.0	30-60 mm straw; ≥ 6 mm sand*					
1.5	soft rubber, < 30 mm straw < 60 mm sand*				paved, clean, good grip	
1.0	wood, hard rubber or plastic matting, asphalt	clean	good grip	good grip, technically impeccable, not harmful to hooves	natural floor, dry, firm	alp.or steeply sloping pasture
0.5	concrete, metal or plastic grids	medium	medium	medium	medium	level or gently sloping pasture
0	concrete slats (see Section 4.1, Tab. 5 for detail)	soiled	slippery	slippery, technical defects, harmful to hooves	slippery, technical defects, harmful to hooves	
- 0.5	concrete slats worse than above (larger gaps width, worse condition)	very soiled	very slippery	very slippery and/or soiled, severe technical defects	very slippery and/or soiled, severe technical defects, morass	

* or equivalent

4.3.1 Column a) – softness of the lying area

In systems with straw for litter, those 25 % of the cubicles with the smallest amount of straw are to be used for the assessment. Floor areas are to be selected, which are most often in direct contact with the animals' limbs and joints during resting. The softness of rubber matting can be assessed by depressing the matting with a thumb. Flooring is to be scored as 'soft' only if it can be visibly dented.

In the case of slatted flooring, regulations under European Standard EN 12737 apply as minimum requirements. If they are not met by the flooring under consideration, then only a provisional ANI-score can be granted (see Section 2). The additional criteria specified in Table 6 have to be fulfilled if any points are to be awarded to slatted flooring in columns d) and e).

Table 6 Measurements of slats [mm]

animals, weight	slat width	gap width	hole diameter
heifers/beef cattle up to 450 kg	80 - 100	25 ± 10 %	≥ 40
more than 450 kg and dairy	80 - 120	max. 32 (single beam) max. 35 (multiple slats)	≥ 50

4.3.2 Column b) – cleanliness of lying area

For a proper assessment of the cleanliness of the lying area, the varying degrees of cleanliness have to be considered which are possible in the particular type of housing system. The most soiled 25% of the lying area are then to be assessed against this range. In sloped floor housing systems, for example, the lying area will always be more dirty than the floor of the tethering stalls, because the front part of the stalls never gets soiled with excreta. Such system-specific differences are to be taken into consideration when returning a single score for the entire housing unit.

4.3.3 Column c) – slipperiness of the lying area

It is essential for the flooring to afford sufficient grip to prevent the animals from slipping or falling or stepping on teats. Good grip also facilitates normal rising and lying down movements. As in column b), assessment has to be carried out qualitatively, because standardized measurement using the appropriate, technical equipment is not always achievable during assessment on the farm. Slipperiness may vary greatly between different floor types such as very slippery, wet, wooden slats or worn-down concrete areas on the one hand, and non-slip rubber matting or dry concrete floors or deep litter on rough concrete on the other. Floor areas with the greatest potential to cause slipping, e.g. areas under hooves in the cubicles or stalls, have to be paid particular attention in the assessment.

An experienced assessor should be able to judge slipperiness by turning and pushing the rubber heel of his or her Wellington boot on the floor using his/her body weight.

4.3.4 Column d) - activity areas

'Activity areas' comprise all areas in loose housing that are regularly used by all animals. In tethering systems, they include passage ways to and from the stalls and to the outside areas. Explanations to column c) should be used for assessing slipperiness. Poorly designed or managed floors may cause considerable sole and hoof wall injuries. Very abrasive floors may also cause sole injury. Technical defects, therefore, refer to any aspects of the floor that may lead to hoof lesions. Examples are high kerbs, uneven surfaces, holes or sharp edges.

For slatted flooring, explanations to column a) apply.

An additional factor to take into consideration in the assessment is how well the animals are habituated to he flooring. Cattle, for example, that are used to walking up steep ramps or steps to reach the outside areas will have less problems with the flooring than animals that are unfamiliar.

4.3.5 Columns e) and f) - outdoor areas

Slipperiness and effects on hoof and limb health are to be used as the main factors in assessing the ground or flooring of the outdoor areas. Wetness and excessive muddiness restrict locomotion and promote infectious diseases of the hooves.

If the animals have access to pasture for more than 30 days per year, then one point should be scored ('natural floor, dry, firm') in column e), plus any additional points from the appropriate row in column f) (this, even if there is additional access to outdoor exercise yards which would score fewer points).

Natural floor is to be awarded one point only if it has not deteriorated through intensive utilisation. Steep slopes with an average inclination of over 20% and alpine pasture are considered better for the animals than more gently sloping pasture because they provide better exercise for the skeletal apparatus and circulation of the animals.

4.4   Sheet 4 – Light and Air

Table 7 Assessment table for 'Light and Air' (Sheet 4)

column	a)	b)	c)	d)	e)	f)
points	daylight in animal house	air quality and air flow	draught in lying area	noise	outdoor areas	
					days/ year	average hours/day
2.0	open fronted housing				≥ 230	≥ 8
1.5	very light	open fronted-housing or optimal air quality			≥ 180	≥ 6
1.0	light	good air quality	none	no noise	≥ 120	≥ 4
0.5	medium	sufficient	sometimes	some noise	≥50	≥ 2
0	dark	bad	often	noise		
- 0.5	very dark	very bad	always	intense noise		

4.4.1 Column a) - day light

Open fronted housing is defined as any housing that provides a wall area of at least 0.45 m²/AWU un-restricted access to open air. The minimum height of these openings has to be 1 m. Light intensity in the unit has to be assessed relative to the whole range of potential light conditions from very dark stables to sunny and bright housing. Light that shines directly into the eyes of the animals must be used in the assessment. In this, the following factors should be considered:

- percentage of window area relative to floor area; 0 % is to be considered as 'dark'; 15 % or more as 'very light';
- position of the windows in the walls or roof (an equivalent area of windows results in brighter stables if windows are in roof structure); distribution of the windows;
- transparency of windows;
- percentage of direct sunlight entering through windows (this is affected by roof projections, trees, buildings that block out the sky etc.);
- angle between the actual, visible horizon and the horizontal plane (mountains, for example, reduce the visible sky area and thus decrease light intensity).

4.4.2 Column b) – air quality

Air quality ranges from optimal (e.g. in open fronted housing or outdoor areas) to very bad in poorly ventilated, closed stables. CO_2 and NH_3 concentrations can be used as parameters in the assessment of air quality (quick measurement using, for example, Draeger tubes or Draeger hand pumps). CO_2 concentration in the air of an animal house is a direct measure of air exchange rate; ammonia content, in addition, depends on slurry and muck management. In buildings with a central vent for outgoing air, the air flow [m³/h] can be measured as follows: first, the average air speed at the vent opening is measured using an anemometer [m/sec]. The air speed is then multiplied by the sectional area of the vent [m²] and then by 3600 [sec/h]. The resulting figure gives a point reading for the airflow. Indirect indicators of low air exchange rates are condensation and mould on walls and windows.

4.4.3 Column c) - draught

Draught results from the movement of colder, outside air through the animal house (at air speeds of > 0.2 m/sec in winter and > 0.5 m/sec in summer). Welfare problems might occur even if only parts of the animal are affected by the draught. Draught problems are particularly likely when animals are tethered with hindquarters to open windows. The quickest and easiest way of checking for draught is to use artificial smoke or fog (e.g. with Draeger flow testing tubes).

4.4.4 Column d) - noise

Mechanical ventilation can cause noise. Animals can be disturbed or even stressed by noise resulting from fans. Sound levels depend on the type of fan, the position of the fans and the overall air resistance. Natural ventilation without any technical aids is to be given a score of 1 point.

4.4.5 Columns e) and f) - outdoor exercise

Frequency and duration of access to outdoor areas are important factors when assessing the overall light and air quality affecting the animals. Additional points are to be awarded only if the average duration of outdoor exercise is ≥ 2 hours. Average duration is calculated as follows: (number of days outdoors in summer * average daily hours outdoors in summer + number of days outdoors in winter * average daily hours outdoors in winter)/365.

4.5 Sheet 5 – Stockmanship

Table 8 Assessment table for 'Stockmanship' (Sheet 5)

column	a)	b)	c)	d)	e)	f)	g)
points	cleanliness of pens, feeding/drinking areas	technical condition of equipment	condition of integument	cleanliness of animals	condition of hooves	techno-pathies	animal health
1.5					perfect	none	very good
1.0	clean	good	good		good	rarely	good
0.5	medium	medium	medium	clean	medium	medium	medium
0	insufficient	defects	insufficient	medium	insufficient	common	bad
- 0.5	soiled	bad	bad	soiled	bad	very common	very bad

Stockmanship and management significantly influence the health and welfare of the animals. To illustrate this, the following two extreme scenarios should be considered. First, good housing conditions might be associated with bad animal welfare. Secondly, good animal welfare and health may be found under restrictive and potentially damaging housing conditions. It is the stockmanship that may make the difference between these two scenarios. Category V, 'Stockmanship' should therefore assess the extent to which the stockman is able to contribute to animals´ well-being and health within the housing system. This actually is very difficult to assess during a farm visit. The approach chosen here therefore relies on indirect indicators of stockmanship. It is suggested that further research should concentrate on identifying better methods of assessing stockmanship. These could then be easily integrated into the existing ANI-

system, as long as the proportion of points assigned to this category stays the same (i.e. 20 % of overall score).

4.5.1 Columns a), b), d) – cleanliness and equipment

Cleanliness of animals and stable equipment and condition of the equipment must be assessed relative to what are the best and worst possible scenarios. These indicators should reflect to what extent the stockman meets his or her responsibility for providing a well-managed housing environment and for preventing damage and stress to the animals.

4.5.2 Columns c), e), f) - integument, hooves, technopathies

For correct assignment of scores in these columns, assessors must be able to identify clinical symptoms that indicate deviations from the normal, healthy status of cattle and are caused by the housing system. Such symptoms include lesions and permanent changes to the integument and hooves, swollen joint, lameness and teat and tail injuries. 'Technopathies' are injuries or damage resulting from any parts of the stable equipment.

4.5.3 Column g) – health

Any health aspects that are not directly affected by the equipment or housing conditions are to be assessed in this column. General health aspects to be considered include the level and incidence of infectious disease, parasite load, overall hygiene, nutritional status, fertility and mortality. If no health records are available, the score cannot exceed 'medium'.

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6. APPENDIX

ANI 35 L/2000 C A T T L E - SHEET 1
December 2000

Category I - LOCOMOTION

(min. 0; max. 10,5 points)
add points of columns a) – f), where applicable

column	a)				b)	c)	d)	e)	f)
	loose housing systems					tether systems		outdoor areas	
	space allowance ('available floor area') [m²/AWU] [1]				lying down, lying & rising [2]	stall size and bounda-ries [2]	movement of tether [m] [3]	(yards or pasture) [4]	
points	dehorned dairy cows	horned dairy cows	suckler herds	young stock, beef cattle				total days/year	pasture [5] days/year
3.0	≥ 8	≥ 9	≥ 7.5	≥ 6	comfort-able			≥ 270	
2.5	≥ 7	≥ 8	≥ 6.5	≥ 5				≥ 230	
2.0	≥ 6	≥ 7	≥ 5.5	≥ 4	medium			≥ 180	
1.5	≥ 5	≥ 6	≥ 4.5	≥ 3				≥ 120	alp. past. ≥ 120
1.0			≥ 4.0	≥ 2.5		comfort-able	≥ 0.6/0.4	≥ 50	≥ 50
0.5					restricted	medium	≥ 0.4/0.3		≥ 30
0	< 5	< 6	< 4.0	< 2.5	very restricted	restrictive	< 0.4/0.3		

[1] Total lying and activity area available to all animals at all times; only half of the floor area of cubicles can be included.
[2] See text for definitions (Sections 4.1.2 and 4.1.3).
[3] The first figure refers to movement back and forth, the second to lateral movement.
[4] Outdoor areas count only if they measure at least 5 m²/AWU and if they can be used by the animals for at least 1 hour on at least 30 days per year, or if it measures at least 3 m²/AWU and can be used by all animals during 24 h per day (in loose housing).
[5] If pasture is part of the husbandry system both columns e and f apply. The single value for alpine pasture applies independently of the number of days the animals stay on alpine pasture. If only parts of a herd are moved up into the mountains to alpine pasture, the herd has to be split according to husbandry system in the assessment and separate ANI-scores must be calculated.

ANI 35 L/2000 CATTLE -   SHEET 2
December 2000

Category II – SOCIAL INTERACTION

(min. - 1,0; max. 10,0 points)
add points of columns a) – e), where applicable

column	a)				b)	c)	d)	e)
	loose housing systems space allowance ('available floor area') [m²/AWU] [1]						outdoor areas (yards or pasture) [4]	
points	de-horned dairy cows	horned dairy cows	suck-ler herds	young stock, beef cattle	herd structure in loose housing and tether systems [2]	management of young [3]	total days/ year	pasture days/ year [5]
3.0	≥ 8	≥ 8	≥ 7.5	≥ 6				
2.5	≥ 7	≥ 7	≥ 6.5	≥ 5			≥ 270	
2.0	≥ 6	≥ 6	≥ 5.5	≥ 4	family herd		≥ 230	
1.5	≥ 5		≥ 4.5	≥ 3	herd without bull		≥ 180	alp. past. ≥ 120
1.0			≥ 4.0	≥ 2.5	stable age or pro-duction groups	own young and constant visual contact to herd	≥ 120	≥ 50
0.5	tether systems					own young in separate building	≥ 50	≥ 30
0	< 5	< 6	< 4.0	< 2.5	tether systems	partial buying-in		
-0.5					frequent change of stall allocation (tether systems) or frequent regroup-ing (loose/group housing systems)	commonly buying-in, young in separate building and/or frequent integration of individ-ual animals into loosely housed groups		

[1]   Total lying and activity area available to all animals at all times; all of the floor area of cubicles can be included.
[2]   See text for definitions (Section 4.2.2).
[3]   If young stock is separated from the herd only during the summer months when out on pasture and has visual contact with the herd during winter, this is to be assessed as 'constant visual contact'.
[4]   Outdoor areas count only if they measure at least 5 m²/AWU and if they can be used by the animals for at least 1 hour on at least 30 days per year, or if it measures at least 3 m²/AWU and can be used by all animals during 24 h per day (in loose housing).
[5]   If pasture is part of the husbandry system both columns e and f apply. The single value for alpine pasture applies independently of the number of days the animals stay on alpine pasture. If only parts of a herd are moved up into the mountains to alpine pasture, the herd has to be split according to husbandry system in the assessment and separate ANI-scores must be calculated

ANI 35 L/2000 C A T T L E -   SHEET 3
December 2000

Category III – FLOORING

(min. - 2,5; max. 8,0 points)
add points of column: a) – f), where applicable

column	a)	b)	c)	d)	e)	f)
	lying area [1]			activity areas, passage ways (in tether systems only if to and from outdoor areas) [2]	outdoor yards [3]	alp. past. & pasture [4]
points	softness	cleanliness	slipperiness			
2.5	≥ 60 mm straw					
2.0	30-60 mm straw; ≥ 6 mm sand o.s.					
1.5	soft rubber, < 30 mm straw < 60 mm sand*				paved, clean, good grip	
1.0	wood, hard rubber or plastic matting, asphalt	clean	good grip	good grip, technically impeccable, not harmful to hooves	natural floor, dry, firm	alp. or steeply sloping pasture
0.5	concrete, metal or plastic grids	medium	medium	medium	medium	level or gently sloping pasture
0	concrete slats (see Section 4.1, Tab. 5 for detail)	soiled	slippery	slippery, technical defects, harmful to hooves	slippery, technical defects, harmful to hooves	
- 0.5	concrete slats worse than above (larger gaps width, worse condition)	very soiled	very slippery	very slippery and/or soiled, severe technical defects	very slippery and/or soiled, severe technical defects, morass	

*or equivalent

[1] In multiple area pens the lying area is the area which is preferred by the animals for lying during resting periods (mainly at night).

[2] The condition of the worst affected parts of the activity areas/passage ways is to be used for the assessment.

[3] Outdoor areas count only if they measure at least 5 m²/AWU and if they can be used by the animals for at least 1 hour on at least 30 days per year, or if it measures at least 3 m²/AWU and can be used by all animals during 24 h per day (in loose housing).

[4] If pasture is part of the husbandry system both columns e and f apply. The single value for alpine pasture applies independently of the number of days the animals stay on alpine pasture. If only parts of a herd are moved up into the mountains to alpine pasture, the herd has to be split according to husbandry system in the assessment and separate ANI-scores must be calculated.

ANI 35 L/2000 C A T T L E -   SHEET 4
April December 2000

Category IV –LIGHT AND AIR

(min. - 2,0; max. 9,5 points)
add points of column: a) – f), where applicable

column	a)	b)	c)	d)	e)	f)
points	daylight in animal house	air quality and air flow [1]	draught in lying area [2]	noise [3]	outdoor areas [4] days/ year	average hours/day [5]
2.0	open fronted housing				≥ 230	≥ 8
1.5	very light	open fronted-housing or optimal air quality			≥ 180	≥ 6
1.0	light	good air quality	none	no noise	≥ 120	≥ 4
0.5	medium	sufficient	sometimes	some noise	≥50	≥ 2
0	dark	bad	often	noise		
- 0.5	very dark	very bad	always	intense noise		

[1] quantitative parameters for air flow and quality assessment:

	winter air flow m^3/AWU,h CO_2 [Vol.%] NH_3 [ppm]			summer air flow m^3/AWU,h
optimal	≥ 200	< 0.1	≤ 5	≥ 500
good	≥ 150	< 0.15	≤ 10	≥ 400
sufficient	≥ 100	< 0.2	≤ 15	≥ 300
bad	≥ 60	< 0.3	≤ 20	≥ 250
very bad	< 60	> 0.3	> 20	< 250

[2] See text for details (Section 4.4.2).
[3] Constant noise from technical equipment especially from ventilation system.
[4] All roofed and unroofed outdoor areas that are available to the animals at any time are to be included here, regardless of space allowance or function.
[5] Average hours per day to be calculated as indicated in text (Section 4.4.5).

ANI 35 L/2000 C A T T L E -   SHEET 5
December 2000

Category V – STOCKMANSHIP

(min. - 3,0; max. 8,0 points)
add points of column: a) – g), where applicable

column	a)	b)	c)	d)	e)	f)	g)
points	cleanliness of pens, feeding/drinking areas [1]	technical condition of equipment [2]	condition of integument [3]	cleanliness of animals	condition of hooves [4]	techno-pathies [5]	animal health [6]
1.5					perfect	none	very good
1.0	clean	good	good		good	rarely	good
0.5	medium	medium	medium	clean	medium	medium	medium
0	insufficient	defects	insufficient	medium	insufficient	common	bad
- 0.5	soiled	bad	bad	soiled	bad	very common	very bad

[1] All areas that may affect the animals' health are to be included here including feed.
[2] Drinkers, cubicle/stall boundaries, mechanical equipment, ventilation system etc.
[3] Condition and health status of skin and coat, presence of ectoparasites etc. are to be used here
[4] Length of the hooves, swelling/injury of coronary groove etc..
[5] See text for explanation (Section 4.5.2).
[6] See text for detail (Section 4.5.3).

Guide for assessment of [3], [4] and [5]:

points		proportion of affected animals in herd [%]	
		degree of damage	
		minor to medium	medium to bad
1.5	very good	≤ 5	≤ 3
1.0	good	≤ 10	≤ 5
0.5	medium	≤ 30	≤ 15
0	bad	≤ 50	≤ 25
- 0.5	very bad	> 50	> 25

ANI 35 L/2000 C A T T L E -   SHEET 6
December 2000

farm: ....   No.:..

system: ....

breed and number of animals: ....

minimum standards:
fulfilled ❏   not fulfilled ❏ →   ANI/prov.
                                        reason: ....
                                        time limit: ....

SUMMARY SCORES

categories	columns							total
	a	b	c	d	e	f	g	
I **LOCOMOTION**	loose/group housing		tether systems		outdoor exercise days/year	pasture days/year.		
	floor area	lying down, rising	cubicle/ stall size	movement of tether				
II **SOCIAL INTERACTION**	floor area	herd struc- ture	young	outdoor exercise days/year	pasture days/year			
III **FLOORING**	lying area			activity areas	outdoor yard	pasture		
	soft- ness	cleanliness.	slipperi- ness					
IV **LIGHT & AIR**	light	air quality	draught	noise	outdoor exercise days/year	outdoor hours/day		
V **STOCKMANSHIP**	clean- liness	condition of equipment.	condition of in- tegument	cleanli- ness of animals	condition of hooves	techno- pathies	health	
total = ANI = ANI/provision yes ❏ no ❏								

comments:

....

date: ....   assessor:...

ANI 35 L/2000 C A T T L E -   SHEET 7
December 2000

SUMMARY DESCRIPTION

1 farm: ....

2 breed and no of animals: ....   2.1 horned ☐   dehorned ☐

3 average milk yield: ....

4 housing system   4.1. tethered housing

                     type of tether stalls: ....

                     size: length .... cm;   width ....cm

                     cow trainer ☐   dung kerb ☐   metal grid ☐

                     others: ....

           4.2.   loose housing

                     cubicles ☐   sloped floor system ☐   deep litter ☐

                     others: ....

                     lying area: raised cubicle ☐   non raised cubicle ☐

                     activity area: slatted floor ☐   non slatted ☐

                     feeding area: ....

                     others: ....

           4.3.   ventilation: eaves to open ridge ☐

                     vent with fan ☐   vent without fan ☐

                     others: ....

           4.4.   outdoor yard ☐   pasture ☐

           4.5.   special features: (e.g. noise, blind corners/alleys, overstocking,..)

                     ....

5 minimum requirements :

     .... fulfilled ☐   not fulfilled ☐   reason ....

                            time limit: