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ANIMAL NEEDS INDEX FOR LAYING HENS

ANI 35-L/2001 – laying hens

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

BARTUSSEK Helmut[1], June 2001

1. PREFACE

The welfare of laying hens is a subject of much public concern throughout Europe. This is reflected in the increase in sales of eggs from more humane, non-cage systems, for example. It is also manifest in the agreement by European Union agriculture ministers to prohibit barren battery cages by 2012. This monumental decision has intensified discussion on the design of alternative housing for hens in order to ensure the protection of their welfare.

Concern for the welfare of the animals that produce our food is not new. The battery cage for laying hens was first exposed in 1964 by the English animal welfarist, Ruth Harrison, in her groundbreaking book, 'Animal Machines'. Since then, a great deal of scientific research, as well as political and public debate, has surrounded the issue of what constitutes a welfare-friendly way of keeping hens.

All too often, the relative welfare merits of differing systems have been obscured or weighted against by overbearing production criteria. This has put producers at odds with public concerns over the way farm animals are treated. The Animal Needs Index is to be welcomed, as a practical and objective method of assessing the extent to which different housing systems fulfil the welfare needs of the birds. As animal protection societies and sponsors of the English translation of the Animal Needs Index for Laying Hens, Compassion In World Farming Trust and Animal Rights Sweden believe that it offers a valuable tool for ensuring hens are kept in conditions that are truly humane.

The European Union has recently taken legislative steps away from keeping hens in the widely condemned battery cage. Efforts are now focusing on further developing the alternative housing systems that exist. So often in the past, hens have been treated as little more than units of production on industrial farms. In this new century, the Animal Needs Index can help to shape a future where hens are treated as sentient beings, and where systems with high welfare standards are accomplished.

Philip Lymbery
Compassion In World Farming Trust

Birgitta Carlsson
Animal Rights Sweden

Work at the Federal Research Institute of Agriculture in Alpine Regions aims at a sustaining utilisation and inhabitation of the Austrian Alps and their foothills. As concepts of sustainability have to reflect ethical demands of society, animal welfare has been a matter of concern of our department for animal housing ever since its foundation in 1974. The development of the Animal Needs Index ANI as an integrated tool to assess housing systems on farm level in respect to animal welfare has been one of our successful efforts since 1985. In 2000 an English version of the ANI for cattle could be published. I express our best thanks to the sponsors for initiating and carrying out an English translation of the ANI for laying hens. It is a pleasure for us now to publish an updated version of this ANI for laying hens.

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2. 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 long version of the TGI (TGI 35-L) became the official system for assessing housing conditions in terms of animal welfare for organic farms in Austria. After the issue of EU Regulation 1804/1999 for organic animal husbandry it still will be used throughout the transitional period ending 2010, for filling regulatory gaps left open by the EU Regulation and for several animal welfare products based on private agreements. 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 (http://www.veeru.reading.ac.uk/organic), in Cordoba, January 2000. The development of the ANI, the bases on which individual index parameters were chosen and first experiences of using the ANI on-farm are detailed in BARTUSSEK (1999). The role which the development of the ANI played in the attempts to promote and regulate farm animal welfare in Austria is thoroughly discussed in BARTUSSEK (2001a). A first complete translation of a TGI-paper, the ANI-35-L for cattle, was strongly supported by Ch. LEEB and S. HELD from the University of Bristol, Division for Animal Health and Husbandry, Department for Clinical Veterinary Science, Animal Behaviour and Welfare Group (BARTUSSEK, LEEB & HELD 2000). The present paper is a translation of the German version of the TGI 35-L for laying hens, which was first published in 1995 (BARTUSSEK 1995), and it contains several amendments to the original German version considering recent experiences with the system. Therefore it is referred to as the ANI 35-L/2001. The British-based farm animal welfare organization, Compassion In World Farming Trust and the Swedish organization, Animal Rights Sweden, financed the translation into English and made this publication possible.

The version of the ANI presented here (ANI-35-L/2001 Laying Hens) applies for the keeping of hens. 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 and Noise ('Light, Air and Noise')
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. 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.

For the qualitative assessment of the ANI-35 points total BARTUSSEK (1988, 1990; adapted 1995) proposed the following limits, or assessment categories (in parentheses: corresponding percentage of the range of points total and one of six school grades):

- < 11 points: not suitable with respect to welfare (0 – 15%; not sufficient)
- 11 to < 16 points: scarcely suitable with respect to welfare (16 – 30 %; sufficient)
- 16 to < 21 points: little (mediocre) suitable with respect to welfare (31 – 50 %; satisfactory)
- 21 to 24 points: fairly suitable with respect to welfare (51 – 60 %; good)

· > 24 to 28 points: suitable with respect to welfare (61 – 75 %; very good)
· > 28 points: very suitable with respect to welfare (> 75 %, excellent)

The Austrian Federal Ministry for Health and Consumer Protection in 1995 issued regulations for organic agriculture and used this structure of welfare categories to establish assessment thresholds. Subsection A8 of the Austrian Food Code (Codex Alimentarius Austriacus) "Agricultural products with the designation biologically produced and derived from them" contains the regulations for biological agriculture (section B contains those for animal husbandry). The subsidiary commission "Organic Agriculture" unanimously passed a motion to introduce the Animal Needs Index TGI-35-L as the official assessment system for keeping farm animals in organic farming. The Code Commission ratified this with a resolution of 23.5.1995. The following ANI points totals were laid down as boundary values for organic husbandry, in conformity with the assessment categories proposed in 1990 and described above: at least 21 points for existing animal housing (fairly suitable with respect to welfare - good) and more than 24 points for conversions and new buildings (suitable with respect to welfare – very good).

Also, since 1995 a private firm owned by several Austrian animal protection organisations (Kontrollstelle für artgemäße Nutztierhaltung) has been controlling egg production under private law using the ANI-35-L-system for assessment of husbandry conditions. According to the regulations of this firm at least 21 ANI-points (fairly suitable) must be earned in layer housing without outside exercise, and more than 28 ANI-points (very suitable for welfare) must be earned in free-range systems. These standards go well beyond the minimum requirements specified by ECC egg-marketing legislation (regulation No. 1274/91 EEC, see table 1 below) and are well established for so-called "animal protection proved" products (BARTUSSEK 2001a, 2001b). In 2000 about one quarter of all eggs sold in Austrian supermarkets were labeled "animal protection proved" and met the respective welfare standards (BARTUSSEK 2001b).

3. DIRECTIONS FOR APPLICATION

3.1. General

The ANI 35-L/2001 Laying Hens applies for the keeping of laying hens and parent birds from the age of about 18 weeks upwards in alternative husbandry systems such as percheries, deep litter housing or free range systems. The version in hand represents the status as of June 2001. In each of the main categories mentioned above, up to 8 individual criteria (columns) – a total of 38 criteria – are to be given a rating in a range of points from minus 0.5 (the worst) to plus 1.5 (the best) in units of 0.5 points. The evaluation points determined in the relevant table columns of the categories are added together. The points total – the ANI score - theoretically can lie between minus 12.0 and plus 45.0. It should be noted for the significance of the range of points that the average value is plus 0.5. Thus the award of 0 points already indicates a circumstance falling within the unfavourable category (poorer than average). As a rule, the tabular values apply for birds of the light laying breeds (weight less than 2kg). For heavier birds (parent birds from broiler stock) extra allowances must be applied in some categories; reference will be made to this again in the explanatory notes for use and/or in footnotes to the data collection sheets.

3.2. Minimum requirements

It is not the purpose of the ANI to make redundant existing animal welfare regulations on minimum space allowance for locomotion, undisturbed feeding, excretion, resting, drinking, room to exercise etc. Rather, it presupposes them. For this, the first assessment step is to check that minimum measurements and other minimum requirements are adhered to. However, minimum standards must be defined in addition, if legal welfare standards (such as EU directives or national farm animal welfare legislation or official minimal welfare recommendations) 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.

Table 1 (page 6) shows minimum requirements according to currently valid European standards as well as those subject to the regulations about farm animal welfare the nine Austrian provinces agreed on in 1993.

Table 1: Minimum requirements for keeping laying hens *(maximum = max. respectively)*

Directive in accordance with	regulation EEC 1274/91[*)]	directive 1999/74 EC	Austrian agreement on farm animal welfare 1993
free range husbandry: outdoor area (m^2/hen)	10	size in order to prevent any contamination	10
semi-intensive husbandry: outdoor area (m^2/hen)	2.5		
popholes giving direct access to outer areas: opening width (cm/hen); minimum size per pop-hole (cm hight/cm width)		0,2 (35/40)	
deep litter housing: usable floor space *(hens/m^2 max.)*	7	9	7
Proportion of littered scratching area (% of floor area)	33 %		33 %
littered scratching area (cm²/hen)		250	
Percheries: usable ground area *(hens/m² max.)*	25		25
perch length (cm/hen)		15	20
horizontal distance between perches (cm)		30	30
linear feeders (cm/hen)		10	16 manual feeders 8 mechanical feeders
circular feeders (cm/hen)		4	3
hens/nipple drinker or drinking cup (max.)		10	15
continuous drinking trough (cm/hen)		2,5	2,5
circular drinking trough (cm/hen)		1,5	1,5
Laying nests: *hens/individual nest (max.)*		7	5
Laying nests: *hens/m^2 group nest (max.)*		120	100

3.3. Method of procedure

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 standardised application of these definitions. Regular meetings of the assessing personnel should ensure refinement and standardisation of the qualitative parameters within organisations.

Separate ANI-assessments are necessary for all different housing systems on one farm. This can be the case, for example, if laying hens and parent birds are kept in the same establishment, or laying hens in different husbandry systems, or in different spatially separated units.

Assessments should take place in the least favourable season (late winter). 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 used by the assessor during his or her farm visit. Sheets 1-5 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 some measurements to be recorded and for the calculation of characteristic units for Sheets 1 to 5.

[*)] and EC 788/95

Important supplementary information to the terms is found directly under the tables as footnotes and in this explanatory text. Using the various columns in the tables indicated with small letters, which are to be considered for the husbandry enterprise being assessed, points are to be awarded in the rows where the animal management under scrutiny can or must be entered. These points are then to be entered accordingly into the summary sheet (Sheet 6). The rows there now correspond to the areas of influence (Sheets 1 to 5), and the row totals give the points totals in the individual five categories. Adding the row totals gives the ANI-score. General information on the establishment is also to be entered in Sheet 6, as well as any proviso arising from a failure to meet the minimum standards, together with the time period set for improvement. A separate summary Sheet 6 is to be filled in for every inspection period and for each (different) husbandry system of an establishment. These sheets can be filed with the other establishment documents of the advisor or inspection body. They make possible a quick overview of the actual status and the development of the animal welfare in a particular farm. If exact plans of housing and free range areas are not available, surveying work must be carried out to establish some measurements, and various specific parameters for Sheets 1 to 5 must be calculated. This can be done in Sheet 7.

The complete ANI comprising all seven sheets and footnotes is given in the Appendix 1. In Appendix 2 several examples demonstrate the appliance and practical implementation of the ANI 35-L-assessment system.

4. THE ASSESSMENT SHEETS

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

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 seven parameters to be assessed (columns a)-g)). Within the columns of Sheet 1, the opportunity for the animals to move and express locomotory behaviour according to their behavioural needs are assessed. Columns d) to g) apply only to housing systems where the hens have access to outdoor yards or grassland. 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)	g)
Points	space allowance (usable floor area)		percentage of littered scratching area	elevated perches available	outdoor areas available			
					outside yard	days per year	grassland area	greatest distance from stable to end of grassland at 10m²/bird [m]
	[m²/hen]	max. [hens/m²]	[% of floor area]	[m/hen]	[m²/hen]		[m²/hen]	
1.5	≥0.25	4				daily	≥15.0	≤50
1.0	≥0.2	5	≥50	≥ 0.08	≥0.5 ≥0.17 pa	≥270	≥10.0	≤80
0.5	≥0.166	6	≥40	0.05 – 0.08	≥0.25 ≥0.08 pa	≥180	≥5.0	≤120
0	≥0.143	7	≥33	< 0.05	≥0.12 ≥0.04 pa	≥120	≥2.5	≤160
-0.5	<0.143	>7	<33	none				>160

4.1.1. Column a) – space allowance (stocking density, m²/hen or hens/m² respectively)

The total usable area is calculated which can be freely walked on at any time by the animals in a group or in a housing unit. A floor area is considered to be usable for walking on if there is at least 50 cm of air space above it (clearance; with the exception of individual perches, which must have at least 30 cm clearance from the ground), if the area is at least 30 cm wide and, in the case of inclined floors, the inclination does not exceed 12 %. Laying nests are counted as usable area except, in the case of nests elevated above the floor, the floor area beneath the nests can be used by the hens unrestrictedly. In other words, if the nests are installed on stands or mounted on the wall in a way that enables the birds to walk on the floor under the nests the respective nest areas and the floor area beneath the nests are not counted twice.

In the right sub-column the highest number of animals is given per m^2 of usable area, corresponding to the stocking density in the left sub-column. That can simplify the assessment procedure. However, only one point value is to be given for the whole of Column a).

In calculating the stocking density the average number of hens kept over the rotation time should be taken into account, since a higher stocking density at the beginning is balanced by a lower density towards the end of the rotation. The "average number of hens" can be established by using the number of animals put into the house (according delivery note) and by assuming an average loss of 6 % over the rotation time (of usually 12 to 15 months). Thus, the average stocking density is calculated by "0.97 * initial hen stock divided by the usable area".

The given numbers apply to animals up to 2 kg in weight. For heavier hens, the usable area must be calculated 15 % larger (Footnote [1)]).

4.1.2. Column b) – size of littered scratching area

A solid floor covered with workable material such as straw, wood shavings or sand etc. spread over the whole area counts as scratching area. The proportion of space for scratching refers to the total usable floor area in the housing in accordance with the definition above. In systems with feeding and/or watering facilities in the area for scratching, half a point is deducted only in the case that the feeding and watering facilities are standing on the floor, or if they are hung at a height lower than the shoulder height of the birds.

4.1.3. Column c) – elevated perches available

The minimum requirement mentioned in footnote[3)], namely 5 cm perch length per animal for elevated perches assumes that raised perches must be available for about 30% of the birds, so that the minimum movement requirement "perching = flying up onto perches" is met. For birds over 2 kg, the minimum perch length is 6cm.

4.1.4. Column d) – outside yard

Footnote [4)] defines minimum conditions under which an area for movement outside the stable can be recognised as such. Allowing the opportunity for quite frequent and extended exercise outside is additionally awarded a bonus in other columns. In accordance with footnote [6)], a patio-type yard can be considerably smaller, but it must be made available to the hens for three times longer per day than the minimum time for outdoor exercise for a normal yard, and must also be accessible equally for the birds along the entire length of the side of the housing. This can allow for the behaviour whereby smaller sub groups in a flock use such a patio area one after another. For birds weighing more than 2 kg, the minimum measurements in the evaluation rows of column d) are to be taken as 15 % larger.

4.1.5. Column g) – greatest distance to end of grassland

This assessment takes account of the fact that hens in the open air do not want to walk too far away from the hen house. Distances greater than 160 m get penalised (malus), since only parts of the grassland are used in such a case, and therefore the opportunities for movement outdoors are restricted too much. Smaller distances, on the contrary, are rated correspondingly higher, since the opportunity for movement increases when the total area is actually used. The linear distance from the exit of the house (popholes) to the furthest corner of the pasture counts as the greatest distance, measured along the shortest path which the birds could take to cover it. In enterprises where more than 10 m^2 of grassland is available to the birds, a most distant point is to be calculated theoretically which would result from allocating 10 m^2 open land per bird.

4.2. Sheet 2 – Social interaction

In the eight columns (a) to h)) of Sheet 2 (Table 3), the various opportunities are assessed for the birds to cultivate their species-specific social behaviour. To avoid social tensions, the crucial factor is once again sufficient room to move for each bird, but the facilities that are necessary or desirable for the hens must be within reasonable reach. For a stable hierarchy, there must be a sufficient number of cocks and elevated perches.

Table 3 Assessment table for 'Social interaction' (Sheet 2)

column	a)	b)	c)	d)	e)	f)	g)	h)
Points	size of separate flock	space allowance (usable floor area) [m^2/hen]	availa-bility of nests, water and feed	elevated perches available	cocks present in the flock	outside yard/ grassland		
						width of popholes to yard or to grassland [cm/bird]	distance to popholes within house [m]	facilities of yard or outside area near stable
1.5	up to 200		very good					
1.0	201 – 500	≥0.20	good	increasing steadily in height or ≥50 % of perches	sufficie nt number of cocks	≥0.4	≤4	very good
0.5	501 – 800	≥0.166	average	≥33% of perches	few cocks	≥0.3	≤6	average
0	>800	≥0.143	Poor	no	no cocks	≥0.2	10	too few
-0.5		<0.143	very poor			<0.2 or tunnel	>10	

4.2.1. Column a) – size of flock

The larger the flock of hens per housing unit, the larger the risk of disturbed social behaviour on intermingling and of serious impairment to the health and wellbeing of the individual animal when there are panic and shock reactions, which can never be completely ruled out. The assessment of the group size in Column a) takes account of this fact.

4.2.2. Columns b) – space allowance and c) – availability of nests, water and feed

The explanatory notes to Sheet 1 Column a) apply accordingly to Sheet 2 Column b). Column c): It is important for normal, species-specific social behaviour that all birds have sufficient space and time for as unrestricted access as possible to the feeding and drinking facilities and the laying nests. For an objective evaluation of the terms "very good" to "very poor" availability of these facilities, the following Tables 4 and 5 are to be considered. As with the assessment sheets, in Table 4 the parameters in Columns a) to e) are to be classified in accordance with the features, and the evaluation points for each column are to be added up. The total points thus calculated can be allocated to the terms relating to the availability of facilities in Sheet 2, Column c), in accordance with Table 5 (page 11). The values apply for birds up to 2 kg in weight, for heavier birds threshold values higher by 15 % are to be inserted in Columns d) and e) of Table 4.

Table 4: Availability of facilities for the birds

Add the points from Columns a) to e) (min. 0, max. 20)

Column	a)	b)	c)	d)	e)
Points	average distance "bird to facilities" [m][1)]	laying nests: perches in front of nest to fly up to [2)]	laying nests: number/size a) birds/m² group nest b) birds/per individual nest	feeding place a) [cm/bird] with linear trough (feeding chain) b) [cm/bird] circumference round trough	Drinking place a) birds/nipple trough b) cm/bird linear trough c) cm/bird circumference round trough or cups
4	≤2	2 perches, distance apart ≥10cm	a)≤40 b)≤4	a)≥12 b)≥9	a)≤11 b)≥3.5 c)≥1.0
3	≤3	2 perches, distance apart <10cm	a)≤60 b)≤5	a)≥10 b)≥7	a)>11 ≤12 b)≥3 c)<1.0 ≥0.9
2	≤4	1 perch, distance from nest ≥10cm	a) ≤80 b) ≤6	a)≥8 b)≥5	a)>12 ≤13 b)≥2.5 c)<0.9 ≥0.8
1	≤5	1 perch, distance to nest <10cm	a)≤100 b)≤8	a)≥6 b)≥3	a)>13 ≤14 b)≥2 c)<0.8 ≥0.7
0	>5	none	a)>100 b)>8	a)<6 b)<3	a)>14 b)<2.0 c)<0.7

[1)] Average value of the average distances between the mid point of the resting area and the facilities allocated to the relevant resting area for feeding, drinking and laying eggs (see illustration 1 below)

[2)] The definitions given in relation to perches are based on the fact that nests must be easy to negotiate if they are in an elevated position in relation to the neighbouring ground. If the nests are directly accessible from the droppings level, 4 points are to be awarded in Column b).

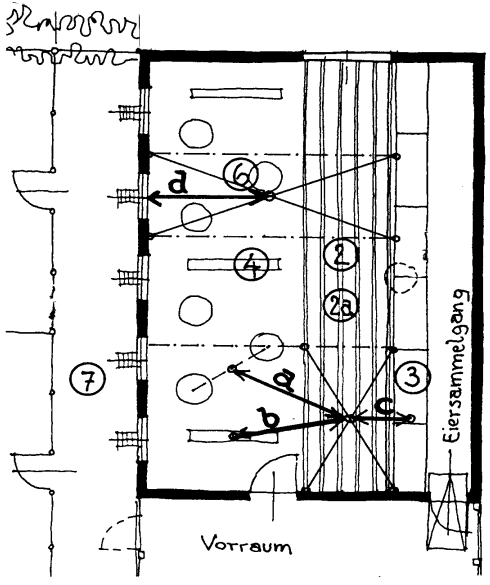
Footnote [1)] to Table 4 above and footnote [6)] to Column g) of Sheet 2 are explained with the aid of Illustration 1 below. Here "**a**" is the average distance to the feeding facilities, "**b**" the average distance to the drinking facilities (linear troughs), "**c**" the average distance to the group nests and "**d**" the greatest distance between an exit (pophole) and the mid point of the housing area to be allocated (in accordance with footnote[6)], Column g) of Sheet 2). The "average value of the average distances" in accordance with footnote [1)] above is calculated thus as:

$(a+b+c) \div 3$.

Illustration 1: Floor plan of a house for laying hens to explain the term "average distance" (German terms translated: Vorraum = anteroom; Eiersammelgang = egg collecting alley)

Key:
2 = droppings level
2a = perches
3 = group nests at the upper end of perches
4 = linear water trough
6 = round feeding trough
7 = outside yard

a = average distance to feeding area
b = average distance to drinker
c = average distance to laying nest
d = average distance to pophole to outside yard



In a supplementary note of May 28th 1998 to the original 1995 definition of the "average value of the average distances to the important facilities" above it was put down that this distance also can be calculated starting from the centre point of the respective part of the layer house (not from the centre of the droppings pit) as it is done with distance "**d**" to the popholes, if this calculation gives a smaller value than the method defined above.

Table 5: Evaluation of points totals in accordance with Table 4

Points total from Table 4	Availability of nests, water and feed
18 – 20	very good
13 – 17	good
8 – 12	average
4 – 7	poor
0 - 3	very poor

4.2.3. Column d) – elevated perches available

Higher ranking hens prefer higher located perches. Perching on higher perches demonstrates rank and in this way contributes to a stable social hierarchy. For calculating a sufficient total length of perches in accordance with footnote [4)] to Sheet 2, a wooden grid as a covering to the droppings pit can be allowed if the structure of the wooden grid meets the criteria of "good" or "average" perch structure as defined in the explanatory notes to Column b) of Sheet 3 (page 12). This also applies for plastic grids, if the dimensions of the webs or rods and the slots are more or less similar to those of wooden grids, or if the health of the foot pads is sufficiently good (see notes on points 4.3.2. and 4.3.3., page 12 in connection with this). Nevertheless, the differentiation between "wooden grid" and "plastic grid" in Sheet 3 Column c) on page 20 stands (see point 4.3.3.).

50 % of the required perch length can be allotted to the floor grid. 1m^2 of floor grid covering can be calculated as 3 linear metres of perch length. One point is to be given if all perches are arranged in such a way that they form a continuous rise (minimum gradient = 12%) or if at least half of all perches are arranged in an elevated position compared with the rest of the perches (clearance height between raised perches and passable surface below at least 30 cm).

If more than the required perch length is available (e.g. because of a large proportion of wooden floor grid which can be counted as perches), the 50 % or 33 % of the length of perch for elevated perches is to be related to the minimum perch length as defined in the Austrian agreement on farm animal welfare 1993 in accordance with Table 1 on page (20 cm/bird).

4.2.4. Column e) – cocks present in flock

Cocks within a flock of layers usually are clearly higher in rank than the hens and by dominant behaviour contribute to a stable social hierarchy and to a significant reduction of agonistic social interactions between hens observed in flocks without cocks. The following cock : hen ratio can be seen as a sufficient number of cocks in a flock of hens from the point of view of their social behaviour:

- up to 60 hens – 1 : 20
- up to 100 hens – 1 : 30
- up to 500 hens – 1 : 50
- over 500 hens – 1 : 66

It must be stressed that cocks of certain races show difficulties to obtain a significant dominant position within the rank order if as young adults added subsequently into a herd of adult hybrid layers. In that case the presence of cocks does not reduce social stress among hens kept under intense housing conditions and the cocks themselves might suffer severely. This situation can be detected by observing damaged cocks behaving anxiously and retrieving from the flock. In this case no points can be awarded in Column e) of Sheet 2. Such negative (and unnatural) situation can be prevented if the cocks are raised together with the female birds from the chicken age on.

4.2.5. Column f) – width of exit openings (popholes)

As in footnote [4)] to Sheet 1, an outside yard and a grassland area are only recognised as such if the birds have access to them via an opening of at least 0.1 cm/bird (at least 20 cm) in width (for birds over 2 kg in weight: 0.12 cm/bird, or a minimum of 25 cm), if the areas are available to the birds at least 120 days a year and for at least two hours a day. Of course, the regulations in accordance with EU marketing legislation (1274/1991) concerning semi-intensive husbandry and free range husbandry, or EU legislation concerning organic husbandry (1804/1999) as well as the requirements according EU directive 1999/74 concerning the well-being of laying hens in alternative housing systems remain unaffected by this stipulation of minimum conditions in connection with the framework of the ANI. On account of the possible detrimental consequences in the event of panic, a tunnel, e.g. below a road to be crossed by the birds on their way to the open outside areas, is to be evaluated most unfavourably, regardless of its internal width. Access to the outside which is made more difficult by steps, ladders or ramps must be taken into account in accordance with footnotes [5)] and [6)].

4.2.6. Column g) – distance to exit openings (popholes)

Explanatory notes to footnote [6)] (see Illustration 1 above: distance "**d**"): First, the total width of the openings to the outside area are to be determined. Where there are several such openings, the hen house aliquot is to be divided into the individual openings to the yard corresponding to their respective widths. The spatial mid points of these ideal areas in the house are then to be established. The greatest distance in each case from such a mid point to the relevant exit opening to the yard is to be taken into account for the assessment. Example: In a house for 500 hens there are two openings to the yard, one with a width of 100 cm, one with a width of 50 cm. The total is 150 cm = 0.3 cm per bird. The larger opening "takes care of" 100/150 and thus 2/3, the smaller 50/150 = 1/3 of the house. The hen house is to be divided virtually according to these size ratios into two units that must be allocated to the openings to the yard. From the spatial mid point of each of these two areas the linear distance – or, if there are obstacles, the shortest way – to the respective allocated opening to the yard is measured. The greater of the two distances is taken into consideration for the assessment.

4.2.7. Column h) – facilities of yard or outside area near stable

If the outside yard (area for exercise near the house) offers good incentives for use, the social climate in the house itself becomes more relaxed. Classification is carried out according to the extent of the range of water, feed, opportunities for dust bathing, protection from sun, wind and rain in accordance with Tables 6 and 7 as follow.

Table 6: Facilities of the yard or area for exercise near the hen house
Add the points from Columns a) to f) (min. 0, max. 12)

Column	a)	b)	c)	d)	e)	f)
points	protection from sun	protection from wind	protection from rain	drinking water for (%) of the birds [1)]	feed for (%) of the birds [1)]	opportunity for dust bathing [2)]
2	yes	yes	yes	≥30	≥30	in the whole area
1	partial	partial	partial	≥15	≥15	in part of the area
0	no	no	no	<15	<15	no

[1)] For measuring the available supply facilities for water and feed, the minimum spatial requirements in accordance with legislation in force (see Table 1, page) apply. Drinking water requirements are deemed to be met if the supply is available in the warm season of the year.

[2)] "Opportunity for dust bathing" means the opportunity for species-specific dust bathing behaviour; for this, there must be sufficient finely textured litter material available, preferably sand.

Table 7: Assessment of the points totals from Table 6

points total from Table 6	quality of yard facilities as defined in Sheet 2, Column h)
9 – 12	very good
4 – 8	average
0 - 3	too low

4.3. Sheet 3 - Flooring

Table 8 Assessment table for 'Flooring' (Sheet 3)

column	a)		b)	c)	scratching area		f)	g)	h)
					d)	e)			
points	length of perches		quality of perches	covering of drop-	thickness and type	condition of litter	floor in nest area	floor in outside yard	pasture, grassland,
	[m/hen]	[hens/ m]		pings level	of litter				condition of turf
1.5						dry, fluffy everywhere	cereal husks, buck wheat husks		
1.0	≥0.20	≤5	good	wooden floor grids	good	dry, up to 30% of area compressed	short straw, hay	clean, work-able	good
0.5	≥0.166	≤6	average	plastic grids and coated wire netting	average	dry, up to 60% of the area compressed	long straw	clean, paved	average
0	≥0.143	≤7	poor	wire netting	poor	dry, over 60% of the area compressed	plastic matting or similar	floor grid, wire netting	poor
-0.5	<0.143	>7				damp, over 60% compressed	wire netting	dirty	very poor

4.3.1. Column a) – perch length

The values apply for light laying breeds. For heavier birds, perch lengths 15% longer are to be adopted. For taking a floor grid into account for the length of perches, the explanatory notes to Column d) of Sheet 2 apply.

4.3.2. Column b) – perch quality

The quality of the perches is a decisive factor in the health of the feet (lesions to the foot pads, bumble feet). The most favourable perches have proved to be those made out of wood which has a groove carved on top (groove 20 mm wide on perches which are 50 mm wide), perches made from two wooden battens (13 mm wide, rounded off, approx. 24 mm between them), perches made from 30 mm wide round beech wood, flattened on top, but also perches made from wire netting. Perches made from iron tubes are to be classified as good in the case, if the health of the foot pads is shown to be good.

Equally favourable is also a floor grid, if the rods are arranged such that the distance between the rods is a maximum of 30 mm and the rods themselves conform to the criteria described above for good wooden perches. Plastic perches (even if the shape is favourable) and rubberised round perches are to be classified as "average" (stressful "micro milieu", see explanatory notes to Column c)). The worst perches are the customary 50/50 to 60 mm wooden rods, even if the edges are rounded. Research into the optimum nature of perches is not yet concluded (SIEGWART 1991, OESTER 1994). Therefore, if there are veterinary reports available to confirm that the foot health is sufficiently good (< 1/3 of the birds from the 20th laying week with findings), the existing perches can be classified as "good", irrespective of their shape, dimensions and the material of which they are made. If findings pertain to more than 1/3 of the birds, the classification "average" is to be given, and if more than 2/3 of the birds are thus identified, this must be given as "poor".

4.3.3. Column c) – covering of the droppings level

A droppings level is that part of the floor in hen house which the birds can walk on which is made to be permeable for the excreted droppings. It serves to separate the birds from a substantial part of their droppings. The type of cover has an influence on how suitable it is for the birds to walk on, and also on the health of their feet. The results of more recent studies indicate that wood is the material of preference (stressful micro milieu when plastic is used, OESTER 1994, AK et al. 1994a, b).

4.3.4. Column d) – thickness and type of litter

The combination of structure (grain size, dustiness) and the thickness is to be assessed. Correctly structured and low-dust litter, e.g. clean (mould-free!) straw or wood shavings, in the correct thickness, is to be assessed as “good”. The thickness of the litter is of great importance for the scratching and dust bathing behaviour (litter as thick as possible) and for the thermal insulation in winter, which in turn is important for avoiding the formation of condensation in the floor area. Layers of litter which are too thin are therefore to be rated unfavourably, however the same applies in deep litter housing without a yard if the layers are too thick, since this does not ensure the required wearing down of the claws. The optimum thickness is considered to be 5 – 15 cm in deep litter housing and percheries without outside exercise, and thicker layers in free range management. 3 – 5 cm (floor coverage throughout!) can be regarded as “average”, less than 3 cm as “poor”. An example of structure that is too coarse is very coarse wood choppings. Very dusty litter is fine sawdust and ground straw, earthy hay etc. Solid surfaces in the hen house which are virtually free from litter become very dirty and are bad in every case.

4.3.5. Column e) – condition of litter

Condition of the litter has an important hygienic function. The assessment must be made subjectively. When classifying the litter, the starting point must be the entire range of variation of the situations which have occurred in practice, taking into account the specific conditions on site. Fluffiness is important from a hygienic and ethological point of view. Topping up regularly with fresh material and scattering feeding grains into the scratching space are very advantageous.

4.3.6. Column f) – flooring in nest area

The following point of view applies for the classification of the floor area in the nest: for proper egg-laying behaviour, hens need the litter in the laying area to be relatively fine and easily workable for hollowing out a nest.

4.3.7. Column g) – flooring in outside yard

When classifying the condition of flooring of outside yards with subjective assessment, the starting point must be the entire range of variation of the situations to be found in practice, taking into account the specific conditions on site. Other condition combinations – such as e.g. clean and partially littered – are to be graded accordingly, in line with the requirements of the birds (health/hygiene, opportunity for scratching, dust bathing).

4.3.8. Column h) – condition of free range areas

When classifying the condition of the free range areas (grassland, pasture etc.) with subjective assessment, the starting point must be the entire range of variation of the situations to be found in practice, taking into account the specific conditions on site. The condition of the ground in a free range area in the woods is to be classified accordingly, in line with the requirements of the birds (health/hygiene, scratching and dust bathing, diversity of natural supplementary foodstuffs).

4.4. Sheet 4 – Light, Air and Noise

Table 9 Assessment table for 'Light, Air and Noise' (Sheet 4)

					outdoor exercise		
column	a)	b)	c)	d)	e)	f)	g)
points	light in the stable (scratching area)	air quality in stable	draught in resting area	mechanical noise in stable	days/ year	hours per day	shade providers on pasture (for % of birds)
1.5	daylight; very even illumination	very good			daily		orchard ≥30
1.0	daylight: even illumination	good	no draught	no noise	≥270	>6	≥20
0.5	daylight: uneven illumination; with artificial light: very even and bright illumination	average	occasionally	faint noise	≥180	>4	≥10
0	daylight: very uneven illumination; with artificial light: uneven illumination	poor	frequently	clear noise			<10
-0.5	very dark	very poor	always	loud noise			none

4.4.1. Column a) – light in the hen house

Natural light of appropriate intensity is important for the hens' health, metabolism and fertility. The following must be taken into account when classifying the natural brightness in the birds' area (25% of the most affected birds = those in the darkest part of the hen house!): the incidence of light through windows depends on a number of factors besides the total surface area of the window and the proportion of window surface in relation to the ground surface (between 0 % = dark house to around 10 % = extremely light house). Also of great significance are the situation of the windows (in wall or roof surfaces, in the long walls or the end walls), the thickness of the walls, the position of the horizon (cut-out open to the sky), the height and depth of any canopies, the direction the windows face, and the cleanliness of the windows. A window surface area of at least 5 % of the floor area is recommended. The effect of the light on the birds works primarily through their eyes. It is of prime importance that the scratching area be well and evenly lit (whereas the nesting area can and should be relatively dark). This is very important for the behaviour of the hens. Sunlight falling directly into the scratching area causes them to sunbathe. If the light shines in unevenly, this can lead to overcrowding in the sunny part and thus to behavioural problems. In the first 4 to 6 weeks after the hens have been put in the shed, the amount of light coming in should be reduced in any case to prevent cannibalism (painting windows or plastic sheeting etc.), since highly bred hybrids demonstrate increased nervousness at the beginning of laying. Since the influencing factors described above cannot be correctly assessed to a sufficient degree in a simple application table, subjective assessment must be definitive.

4.4.2 Column b) – air quality

Here the air quality and/or air exchange rates are to be assessed (between very good and very poor). For this, there are objective criteria in the footnotes for air exchange rates (winter and summer) and noxious gases (concentrations of CO_2 and NH_3). The CO_2 content of the air is a direct measure for the exchange of air. Higher concentrations of NH_3 (ammonia) irritates the mucous membranes of the eyes and the respiratory passages very much and comes predominantly from the droppings. The concentration of ammonia in the hen house air decreases with the air exchange rate and increases with the temperature of the house, but is mainly connected with muck management (and the dryness of the scratching area). If at all possible, conditions must be avoided which give rise to the discharge of ammonia, such as leaving the

droppings for a long time in the house (daily removal of the droppings under the droppings level would be ideal, failing that, at least the weekly removal) and above all, humid conditions in the droppings pit (and in the soiled litter!). In addition to regular removal of excrement (requires mechanical systems in larger housing units), the aim must be good ventilation of the droppings area (side walls of droppings pit should be wire grating) and the definite avoidance of water spray getting into the droppings area (systems for catching drips). CO_2 and NH_3 concentrations can be measured with the DRAEGER gas detector (hand pump) and the short-time inspection tubes of the type carbon dioxide 0.1%/a and ammonia 5/a. The readings are taken in about the centre of the scratching area, at hand level (because the ammonia produced spreads very quickly, the location of the reading is relatively insignificant). The required number of strokes of the pump (n) is indicated on the measuring tube. Air exchange rates can be directly recorded more exactly only where there is a central exhaust air duct. For this, the average exhaust air speed (measured with an anemometer, usually in m/sec) is multiplied by the diameter of the duct (m^2) and by 3600 (sec/h). The result is an instantaneous reading. The effort required in getting a sufficient reliable result is not inconsiderable. Therefore there is a need to gauge the possible air exchange rates using other criteria. Point 5. of these explanatory notes contains information on this subject based on construction requirements for ventilation. Experience has shown that even this information cannot be meaningfully applied in all cases in practice. Rough, indirect indicators for an air exchanges rate which is too low in winter are stuffy air (burning eyes) and condensation forming on ceilings and walls. If the categorisation is indistinct, and if the total ANI result lies just on the boundary between two categories, the result of the noxious gas measurement must be taken into account again.

4.4.3. Column c) - draught

Draughts must be avoided in the resting area. Draughts arise mainly when the body of the bird is hit by moving air which is obviously colder than the rest of the air in the house, or when only parts of the body are hit by more strongly moving or cooler air. This is of course always to be expected if the resting area (perch area) is adjacent in terms of flow to an outer wall with windows, and these windows have to be used for air intake. Other causes of draughts can be cracks on the ground at doors or droppings pits, exits to the exercise area and badly functioning inlets for fresh air (cold air coming down from above). If exits to the exercise areas are far enough removed from the resting area, or if they are lower than the droppings area (lowest part of the perches level), there is no risk of draughts from the openings to the exercise area. In addition, these exits are generally closed at night, so that there is essentially no risk of draughts from here during the main resting period. The simplest method is to check the draught situation with marker smoke (e.g. Draeger flow testing tubes). If the marker smoke moves in the birds' area (in the resting area on the perches) faster than normally rising cigarette smoke, there is a risk of draughts. If correctly installed, fresh air intake via air permeable porous ceilings ("breathing" ceilings) excludes the possibility of draughts.

4.4.4. Column d) – mechanical noise

Hens have a highly differentiated "sound language" which should not be disturbed by constant technically made noise. In natural ventilation (by stack effect, thermal buoyancy, in winter and by wind effect in summer) there are no ventilation noises. Natural ventilation without any technical aids is to be given a score of 1 point. Mechanical ventilation can vary greatly in noise as a consequence of the ventilator noises. Sound levels depend on the type of fan, the position of the fans and the overall air resistance. In the classification process, the starting point should be the possible breadth of range in practice. Short-term noise is not to be assessed; the extent of the noise is to be graded accordingly, in line with the relationship to the existing noise of the hens (slightly louder, significantly louder, disturbing).

4.4.5. Columns e) and f) - outdoor exercise

For the category "Light, Air and Noise", both the frequency of going out and the daily duration of the time spent outside are of importance, so that points can be awarded in both columns, whereby additional points can be given in Column f) only when the time spent outside exceeds 4 hours (if this time is less than two hours, it is not assessed at all). If the time the birds spend outdoors varies greatly between summer and winter (e.g. all day in summer and two hours in winter), an average value must be entered in Column f), calculated from the respective frequency of the short and long times spent outside in relation to 365 days, according to the following equation: average duration of time spent outside = summer days spent outside * daily summer duration of time spent outside divided by 365 + winter days outside * daily winter duration of

time spent outside divided by 365. (Examples: 180 days all-day grazing divided by 14 hours of daylight and 90 winter days outside with two hours per day = 270 days; average duration calculated of time spent outside: 180 x 14 ÷ 365 + 90 x 2 ÷ 365 = 7.4 = > 6, giving 1 point. 100 grazing days at 6 hours per day + 180 days outside at 3 hours per day = 280 days; average duration calculated of time spent outside: 100 x 6 ÷ 365 + 180 x 3 ÷ 365 = 1.64 + 1.48 = 3.12, thus < 4, giving no points (no additional bonus for duration of time spent outside). [In accordance with currently applicable legal provisions, hens must be able to get to grassy areas unrestricted and on a daily basis during the day, if the marketing categories "free range" or "from semi- intensive husbandry" are to be declared. Where access to outside is restricted – only on the yard and not on a daily basis during the day – only the categories "deep litter housing" or "from percheries" can be stated. However, those indoor husbandry systems can be made significantly more animal friendly with the assessment stages of a restricted access to exercise presented here in the ANI system, which would be a step forward to improved animal protection and which could be important for specific brands or promotion programmes].

4.4.6. Column g) – shade providers on grassland

To ensure the optimum climate on the pasture on warm summer days, shade must be provided. An orchard would be ideal, with evenly spaced trees close together (definition of orchard in line with the regulations for the promotion of windfall fruit: at least 30 trees/ha with a trunk height of at least 1.6 m). Low roof-shaped awnings covered in canes have proved to be effective. Low (poorly ventilated) shade providers shaped like tent roofs, made from fabric or plastic sheeting, which become warm in the sun and radiate heat down to the birds (often not adopted at all for this reason) are to be given a correspondingly less favourable grading. The more birds which find a place under such means of shade, the more bonus points the management system receives. The numerical values represent the percentage of the total flock, whereby the density of cover under the awnings can be taken as 12 birds per m^2.

4.5. Sheet 5 – Stockmanship

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

column	a)	b)	c)	d)	e)	f)	g)
points	cleanliness of nests, feeding, drinking facilities	technical condition of hen house facilities	carcasses in hen house	age-dependant condition of plumage	condition of skin	hen house record keeping	bird health
1.5	very clean	excellent		very good	very good		very good
1.0	clean	good		good	good	accurate/ complete	good
0.5	average	average	none or a few, fresh	average	average	partial	average
0	slightly dirty	shortcomings	several fresh, or a few, already stiff, not yet discoloured	poor	poor	no	poor
-0.5	dirty	poor	several, stiff, discoloured to carcass-like	very poor	very poor		very poor

Stockmanship and management significantly influence the health and welfare of the animals. Proper, vigilant and careful treatment of the animals and their environment can compensate for objectively given hardships equally as much as incorrect, negligent, careless and aggressive treatment makes the situation worse for 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 also 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 single 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).

As already indicated in chapter 2. Introduction, category V is not a matter of an adequate assessment of the hygiene and preventive health programmes carried out, but instead deals only with characteristic data to record the quality of care. A high ANI points total is neither an indicator of adequate operational hygiene, nor is a low ANI value an indication of unsatisfactory animal health in a clinical sense, or of hygienically tainted products. For classification into the categories of Columns d) to g), veterinary knowledge or at least specialist husbandry knowledge is required. The average condition of the flock is to be ascertained and assessed.

4.5.1. Columns a) and b) – cleanliness and technical condition of equipment

Cleanliness of stable equipment and technical 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 d) and e) – condition of plumage and skin

Cannibalism depends on many factors, but in particular results, in addition to increased deaths, in damage to the skin and the plumage. Damage to the skin also occurs from ectoparasites. To what extent such damage is avoided – visible from the condition of the surface of the bird – says a lot about the intensity of the care. When classifying the condition of the birds, the starting point must be the range of conditions possible in practice, whereby the duration of use of the birds must be taken into account accordingly.

4.5.3. Column f) – recordings

To evaluate the state of health of the flock (laying capacity, use of medication, deaths etc.), exact and complete records are necessary (hen house record keeping). Such an activity is therefore a mandatory element in good animal care.

4.5.4. Column g) – health

Any health aspects which go beyond plumage and skin damage 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, laying performance and mortality. If there are neither records relating to these nor appropriate binding confirmation from a veterinary surgeon or an animal health service, only an average grade can be given at best in the animal health category.

5. GRADING OF THE AIR RATES DEPENDANT ON THE FEATURES OF THE BUILDING

If the air exchange rate in the closed hen house (Sheet 4, category IV, Column b)) can neither be subjectively established with sufficient certainty, nor objectively measured, it can be estimated according to the features of the building in line with Tables 9 and 10 which follow, since optimum air rates can only be guaranteed when specific technical conditions of the building are met. If these do not exist, then it is generally not possible to provide proper ventilation. (The procedure presupposes correct use of the available features by the farmer; if this is not the case, proper use is relatively easy to achieve by means of consultation). These conditions relate to the presence, design, technical state and the size of equipment for incoming fresh air and for the extraction of exhaust air, and the probability that the type of air inlets at larger air rates in the winter will ensure that draughts are avoided in the animals´ resting area. Experience shows that, where there is a conflict between the provision of sufficient fresh air and draughts coming in, generally draughts takes precedence at the cost of air quality (the harmfulness of warm, humid and stuffy air for hens is less well known by stockmen; draughts are directly noticed).

The reference quantity for the calculation is 1 animal weight unit AWU (500 kg live weight) of the birds accommodated in the house. In ascertaining the characteristic size for the cross sections areas of the ventilation openings and ducts in Table 10, the surface area of all windows, or the cross sections areas of all exhaust air ducts respectively in m^2 are to be added together and then divided by the total AWU figure.

To work out the air exchange rate in accordance with Table 10 (next page), the relevant housing situation in the three categories "AIR INLETS", "AIR OUTLETS" and "POSITION OF THE RESTING AREA IN RELATION TO THE AIR INLET OPENING" is to be assessed in four grades for each (0 to 3); the evaluation points are then to be added up. This total is to be allocated to the terms presented in the Sheet 4, "Category IV", Column b), in accordance with the following table 9:

Table 9: Allocation of the points totals from Table 10 to the air ratios in Category IV (Sheet 4, Column b))

Points total	Air exchange rate in the closed hen house
8 – 9	Optimum
6 – 7	Good
4 – 5	Adequate
2 – 3	Sparse
0 – 1	Too low

Table 10: Estimate of the air ratios according to features of the building
Add the points under headings I, II and III

evaluation points	I AIR INLET	II AIR OUTLET	III POSITION OF RESTING AREA in relation to air inlets
3	porous "breathing" ceiling covering entire surface [1)]	ventilator adequate [2)] or air exhaust ducts > 0.1 m^2/AWU	housing units with absolutely draught-free condition in the resting area
2	partial porous "breathing" ceiling; air inlet panels at drip; air intake channels with flaps etc. air inlets situated in the ceiling area	ventilator too small or air exhaust ducts < 0.1 m^2/AWU	resting area ≥ 4 m away from windows as air intake opening or from easy to control air intake ducts
1	only windows totalling > 1.0 m²/AWU	roof opening or windows > 1.0 m²/AWU	resting area ≥ 2 m away from windows as air intake opening, or from hard to control air intake ducts
0	only windows < 1.0 m^2/AWU total surface area	only windows < 1.0 m^2/AWU total surface area	resting area directly under windows as air intake opening

1) Porous "breathing" ceilings are air permeable constructions in the ceiling area – mainly made of glass fibre insulation materials suspended on air penetrable covering like mineralised wood wool panels or wire mash - for providing fresh air in the hen house without causing a draught, and have been state of the art for more than 20 years.

2) Equating ventilator performance and exhaust ducts cross section applies only for the winter ventilation, since this is the more critical in most hen houses (the ANI data collection should also be carried out in the winter). In judging a ventilation system according to "adequate" or "too small", the opinion of the hen house staff should be taken into account, if the volume flow cannot be ascertained more exactly by using an anemometer. In the latter case, the limit for the winter air exchange rates in accordance with the footnote table of data collection Sheet 4 "Category IV" must be drawn by the use of objective climate criteria at 300m^3/AWU,h (higher than this, adequate, lower than this too scant). If summer ventilation is a problem in an establishment, the guarantee of ventilator summer air rates as defined in the footnote table in ANI data collection Sheet 4 "Category IV – Light and Air" must be checked.

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7. APPENDIX 1

ANI 35-L/2001 LAYING HENS - Sheet 1

June 2001

Category I - LOCOMOTION
(min. – 2.0; max. 9.0 points)
Add the points from Columns a) to g), where applicable

column	a)		b)	c)	d)	e)	f)	g)
Points	space allowance (usable floor area) [1]		percentage of littered scratching area [2]	elevated perches available [3]	outdoor areas available [4]			
	[m^2/hen]	max. [hens/m^2]	[% of floor area]	[m/hen]	outside yard [5] [m^2/hen]	days per year	grassland area [m^2/hen]	greatest distance from stable to end of grassland at 10 m^2/bird [m]
1.5	≥0.25	4				daily	≥15.0	≤50
1.0	≥0.2	5	≥50	≥ 0.08	≥0.5 ≥0.17 pa [6]	≥270	≥10.0	≤80
0.5	≥0.166	6	≥40	0.05 – 0.08	≥0.25 ≥0.08 pa [6]	≥180	≥5.0	≤120
0	≥0.143	7	≥33	< 0.05	≥0.12 ≥0.04 pa [6]	≥120	≥2.5	≤160
-0.5	<0.143	>7	<33	none				>160

[1] The values apply for birds up to 2 kg in weight; for heavier birds, areas 15 % larger apply.

[2] The values apply for systems with feeding and drinking facilities on the droppings level. If feeding and/or drinking provision is arranged in the scratching area, half a point less is to be awarded if the feeding and watering facilities are standing on the ground in the area for scratching, or if they are hung at a height lower than the shoulder height of the birds.

[3] Perches are only considered to be such if they are mounted at least 30 cm above the relevant ground and are available on a scale of at least 0.05 m/bird (for birds over 2kg in weight: 0.06m/bird). A floor grid cannot be counted here.

[4] An area for exercise separated from the hen house out in the open air is only considered as such if it is patio-like (pa) (see below [6]), or if it measures at least 0.12 m^2/bird (for birds over 2 kg in weight, 15 % larger = 0.14 m^2/bird), and if it is available to all birds for at least two hours a day on at least 120 days of the year, and if there is an exit opening between the hen house and the yard measuring at least 0.1 cm/bird in width. It can (and should) be covered; however it must have at least one side completely open to the fresh air to ensure unimpeded exchange of air.

[5] A yard is deemed to be an area for exercise in the open air, directly connected to the hen house, without vegetation. If grassland (pasture) is available, the exercise area near the hen house only counts additionally as a yard if it is clearly marked off from the area covered with vegetation (e.g. by a fence or by the nature of the construction of the surface). For birds over 2 kg in weight, the minimum areas applicable are 15 % larger.

[6] pa = patio-like yard: a patio-like yard is only considered as such if it does not meet the minimum area requirement as defined in footnote [4], but measures at least 0.04 m^2/bird (for birds over 2 kg in weight, 15 % larger = 0.046 m^2/bird), if it reaches along one entire longitudinal wall, if it is equally accessible by the birds along this longitudinal wall, and if it is freely available to all birds for at least six hours a day on at least 120 days in the year.

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Category II – SOCIAL INTERACTION
(min. –2.0; max. +9.0 points)
Add the points from Columns a) to h), where applicable

column	a)	b)	c)	d)	e)	f)	g)	h)
Points	hens per spatially separate group [1]	space allowance (usable floor area) [2] [m^2/hen]	availa-bility of nests, water and feed [3]	elevated perches available [4]	cocks present in the flock [3]	outside yard/ grassland: width of popholes to yard or to grassland [5] [cm/bird]	outside yard/ grassland: distance to popholes within house [6] [m]	outside yard/ grassland: facilities of yard or outside area near stable [7]
1.5	up to 200		very good					
1.0	201 – 500	≥0.20	good	increasing steadily in height or ≥50 % of perches	sufficient number of cocks	≥0.4	≤4	very good
0.5	501 – 800	≥0.166	average	≥33% of perches	few cocks	≥0.3	≤6	average
0	>800	≥0.143	Poor	no	no cocks	≥0.2	10	too few
-0.5		<0.143	very poor			<0.2 or tunnel	>10	

[1] No sight contact permissible up to 1.0 m above the birds' area.

[2] For birds weighing more than 2 kg, 15 % larger area required.

[3] To quantify the terms, see explanatory notes to the data collection sheets.

[4] Can only be taken into account when a total of at least 0.143 m perch/bird (7 birds/m) is available.

[5] If there is not only a through way between the hen house and the exercise area /grassland, but also between the yard and the pasture, the narrower of the two widths is to be taken into account for the assessment. The minimum width of a through way is 0.1 cm/bird and at least 20 cm for each opening. These values and the tabular values are to be increased by 15 % for birds weighing over 2 kg. If sloping pathways (ramps, steps or ladders) make access to the exit more difficult (e.g. floor of hen house significantly higher than neighbouring terrain), the values only apply if the sloping pathways are at least 25 % wider throughout than the width of the through ways, otherwise half a point less is to be awarded. If there are very obvious obstacles (steepness, height, bends) one whole point less is to be awarded (but no lower than minus 0.5).

[6] Greatest distance between an exit and the midpoint of that area of the hen house which is to be allocated to this exit in accordance with the width of its through way per bird (see illustration 1 in the explanatory text, page). If access to the yard is clearly made more difficult by sloping pathways as defined in footnote[5], the length of this pathway is to be calculated together with the distance.

[7] The factor to be assessed is the incentive to use the yard or the exercise area near the hen house, above all the range of water, food, opportunity for dust bathing, protection from sun, wind and rain, in accordance with Tables 6 and 7 in the explanatory text, page .

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Category III – FLOORING
(min. –2.5; max. +9.0 points)
Add the points from Columns a) to h), where applicable

column	a)		b)	c)	scratching area		f)	g)	h)
					d)	e)			
points	length of perches [1] [m/hen]	[hens/m]	quality of perches [2]	covering of droppings level [3]	thickness and type of litter [2]	condition of litter	floor in laying area (nest)	outside yard [4]	pasture, grassland, condition of turf [5]
1.5						dry, fluffy everywhere	cereal husks, buck wheat husks		
1.0	≥0.20	≤5	good	wooden floor grids	good	dry, up to 30% of area compressed	short straw, hay	clean, work-able	good
0.5	≥0.166	≤6	average	plastic grids and coated wire netting	average	dry, up to 60% of the area compressed	long straw	clean, paved	average
0	≥0.143	≤7	poor	wire netting	poor	dry, over 60% of the area compressed	plastic matting or similar	floor grid, wire netting	poor
-0.5	<0.143	>7				damp, over 60% compressed	wire netting	dirty	very poor

1) If the droppings level is covered by a floor grid, 1m^2 of floor grid which can be freely walked on (without the area which may be obstructed by feeding troughs) can be counted as 3 linear metres of perch length, if the design of the floor grid can be judged to be "good" or "average" in accordance with Column b.
2) For definitions, see explanatory notes to the data collection sheets (page 12).
3) The area which the birds can walk on is to be assessed, whereby perches arranged on or above the droppings level are not taken into account.
4) If the yard is covered, an additional 0.5 of a point is awarded.
5) In making the judgement, the starting point is to be the average conditions of the total area that the birds can walk on, taking into account the condition of the vegetation determined by the season.

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Category IV –LIGHT, AIR AND NOISE
(min. –2.5; max. 9.0 points)
add the points from Columns a) to g), where applicable

					outdoor exercise		
column	a)	b)	c)	d)	e)	f)	g)
points	light in the stable (scratching area) [1]	air quality in stable [2]	draught in resting area	mechanical noise in stable [3]	days/ year	hours per day [4]	shade provision on pasture (for % of birds) [5]
1.5	daylight; very even illumination	very good			daily		orchard ≥30
1.0	daylight: even illumination	good	no draught	no noise	≥270	>6	≥20
0.5	daylight: uneven illumination; with artificial light: very even and bright illumination	average	occasionally	faint noise	≥180	>4	≥10
0	daylight: very uneven illumination; with artificial light: uneven illumination	poor	frequently	clear noise			<10
-0.5	very dark	very poor	always	loud noise			none

[1] If additional windows are built in to an existing hen house with bright and even artificial lighting, a plus point is awarded in each case if the area of the windows amounts to at least 5 % of the area of the floor.

[2] Quantitative parameters for air exchange rates and air-quality assessment:

Subjective evaluation	winter air flow [m^3/AWU,h]	CO_2 [Vol.%]	NH_3 [ppm]	summer air flow [m^3/AWU,h]
very good	>750	≤0.1	≤5	>1500
good	>450	≤0.15	≤10	>1200
average	>300	≤0.20	≤15	>900
poor	>180	≤0.30	≤20	>750
very poor	<180	>0.30	>20	<750

[3] Constant noise from technical equipment especially from ventilation system.

[4] A patio-type yard as defined in footnote [6] to Sheet 1 without any other grassland (in each case only useable by one section of the birds) is to be awarded 0.5 of a point less.

[5] For classification, the starting point must be a cover density under the shade provider of 12 birds/m^2.

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Category V – STOCKMANSHIP
(min. –3.0; max. 9.0 points)
Add the points from Columns a) to g)

column	a)	b)	c)	d)	e)	f)	g)
points	cleanliness of nests, feeding, drinking facilities	technical condition of hen house facilities [1)]	carcasses in hen house	age-dependant condition of plumage [2)]	condition of skin [3)]	hen house record keeping	bird health [5)]
1.5	very clean	excellent		very good	very good		very good
1.0	clean	good		good	good	accurate/ complete	good
0.5	average	average	none or a few, fresh [4)]	average	average	partial	average
0	slightly dirty	shortcomings	several fresh, or a few, already stiff, not yet discoloured	poor	poor	no	poor
-0.5	dirty	poor	several, stiff, discoloured to carcass-like	very poor	very poor		very poor

[1)] Drinking troughs, perches, coverings of droppings levels, ventilation systems etc.
[2)] Mainly damage caused by cannibalism
[3)] Ectoparasites, injuries (cannibalism)
[4)] Body of bird is still warm and soft, or is already cold but still soft
[5)] Frequency of deaths, falls in productivity, all diseases and damage which do not come under points [2)] and [3)].

ANI 35-L/2001 LAYING HENS - Sheet 6

Establishment:.....No:…….....

Hen house No., Management system: .....

Breed and number of birds: .....

Minimum requirements:
fulfilledY not fulfilledY >>> ANI/provisionally; Reason: .....

Transitional period ends:.....

SUMMARY SCORES

Categories	Columns a)	b)	c)	d)	e)	f)	g)	h)	Total
I Locomotion	space allowance	size of litteres scratching area	elevated perches available	outside yard	Exercise days per year	grassland area	greatest distance to end of grassland		
II Social Inter-action	size of separate flock	space allow-ance	availa-bility of facilities	raised perches available	cocks present in the flock	width of popholes to outside area	distance to popholes	facilities of yard	
III Flooring	length of perches	quality of perches	covering of drop-pings level	thickness and type of litter	condition of litter	floor in nest area	floor in outside yard	condition of turf	
IV Light, Air and Noise	light in the stable	air quality in stable	draught in resting area	mechani-cal noise	outside days per year	outside hours per day	shade providers		
V Stockman-ship	cleanliness of facilities	condition of facilities	carcasses in hen house	condition of plumage	condition of skin	recordings	bird health		
					Points total = ANI-score = TGI/provisionally yes Y no Y				

Date: …….. Assessor:…….

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Measurements and calculation of auxiliary quantities for the ANI Tables

Establishment:……..
Hen house No.:…….

(1) No. of birds = ; AWU = no. of birds x bird weight [kg] ÷ 500 = AWU
(2) Usable area (area that can be walked on) [m^2] = [m^2]
(3) Size of littered scratching area [m^2] = [m^2] proportion of scratching area [%] = size of scratching area ÷ usable area * 100 = [%]
(4) Length of perches [m] (1 m^2 floor grid = 3 m perch length) = [m] Length of perch per bird = length of perches ÷ no. of birds = [m/bird] elevated perch length [m] Length of elevated perches or perches increasing in height per bird = [m/bird] Proportion of elevated perches = Length of elevated perches ÷ total length of perches x 100 = [%]
(5) Area of outside yard [m^2] = [m^2] Area of yard per bird = area of yard ÷ no. of birds = [m^2/bird]
(6) Area of grassland per bird = [m^2/bird]
(7) Greatest distance hen house – end of grassland = [m]
(8) Availability of facilities: a = distance from feed = [m]; b = distance from drinking facilities = [m]; c = distance from nests = [m] Average distance = (a + b + c) ÷ 3 = [m]
(9) Birds/m^2 group nest = Birds/individual nest =
(10) Feeding space [cm/bird] = [cm/bird]
(11) Birds/water nipple = cm/bird drinking trough length = [cm/bird]
(12) Points total “Availability of facilities” =
(13) Width of exit to outside yard/bird = [cm/bird] width of passage from yard to grassland/bird = [cm/bird]
(14) Average distance to popholes to “d” [m] = [m]
(15) Feeding space in yard [cm/bird] = [cm/bird] sufficient for % of birds length of water trough in yard [cm/bird] or no. birds/water nipples [cm/bird] sufficient for % of birds
(16) Air intake: window area [m^2/AWU] = [m^2/AWU]
(17) Air exhaust duct: cross section [m^2/AWU] = [m^2/AWU] Window- /ceiling openings [m^2/AWU] = [m^2/AWU]
(18) Points total air exchange rates =

8. APPENDIX 2 – EXAMPLES

8.1. Differences in ANI-assessments at best techniques with good animal care, and bad techniques with very poor management where the housing conditions are otherwise identical, using the example of a case of intensive deep litter housing without outside exercise

2,000 hens (without subdivisions), without cocks, 7 birds/m^2 of usable stable area, 33% of area for scratching, good availability of nests, water and food, no perches, hen house without windows.

1.) Very good conditions:

Wooden floor grid on the droppings level, 10 cm low-dust clean litter, automatic nests with buckwheat litter, even and bright artificial illumination of scratching areas, very good air quality in the hen house (4 ppm NH_3), no draught, slight ventilator noise, clean hen house in perfect condition, few fresh carcasses, condition of plumage and skin good, complete management recordings, health of birds very good.

Table 11: ANI–assessment Example 8.1 – 1.)

	a)	b)	c)	d)	e)	f)	g)	h)	total
I	0	0	0	0	0	0	0	-	0
II	0	0	1.0	0	0	0	0	0	1.0
III	-0.5	-	1.0	1.0	1.5	1.5	0	0	4.5
IV	0.5	1.5	1.0	0.5	0	0	0	-	3.5
V	1.0	1.5	0.5	1.0	1.0	1.0	1.5	-	7.5
total								ANI =	**16.5**

2.) Poor conditions:

Plastic grid on the droppings levels, 4 cm wood shavings litter, up to 60 % of the area trodden flat, plastic mats in the nests, uneven illumination of the scratching area, 20 ppm NH_3 in the hen house air, no draught, distinct noise, slightly dirty supply facilities in average condition, putrefied carcasses, poor plumage condition, average skin condition, no records kept.

Table 12: ANI–assessment Example 8.1 – 2.)

	a)	b)	c)	d)	e)	f)	g)	h)	total
I	0	0	0	0	0	0	0	-	0
II	0	0	1.0	0	0	0	0	0	1.0
III	-0.5	-	0.5	0.5	0.5	0	0	0	1.0
IV	0	0	1.0	0	0	0	0	-	1.0
V	0	0.5	- 0.5	0	0.5	0	0.5	-	1.0
total								TGI =	**5.0**

8.2. Differences to the systems of 8.1. above by the addition of an outside yard

Patio-type covered yard, totalling 80 m^2 (0.04 m^2/bird) without additional facilities, accessible during the day every day via a total of 3.0 m openings (0.15 cm/bird), distance to exit to outside area 7 m; paved area in yard without litter:

In relation to Example 8.1 – 1.) above; clean yard

Table 13: ANI–assessment Example 8.2 – 1.)

	a)	b)	c)	d)	e)	f)	g)	h)	total
I	0	0	0	0	1.5	0	0	-	1.5
II	0	0	1.0	0	0	- 0.5	0	0	0.5
III	0	-	1.0	1.0	1.5	1.5	1.0	0	6.0
IV	0.5	1.5	1.0	0.5	1.5	0.5	0	-	5.5
V	1.0	1.5	0.5	1.0	1.0	1.0	1.5	-	7.5
total								TGI =	**21.0**

1.) In relation to Example 8.1 –2.) above; dirty yard

Table 14: ANI–assessment Example 8.2 – 2.)

	a)	b)	c)	d)	e)	f)	g)	h)	total
I	0	0	0	0	1.5	0	0	-	1.5
II	0	0	1.0	0	0	- 0.5	0	0	0.5
III	-0.5	-	0.5	0.5	0.5	0	0	0	1.0
IV	0	0	1.0	0	1.5	0.5	0	-	3.0
V	0	0.5	- 0.5	0	0.5	0	0.5	-	1.0
total								TGI =	**7.0**

8.3. Effects of different improvement measures on the result of the ANI-assessment (deep litter housing, semi-intensive housing and free-range management)

The situation at the outset corresponds to the Example 8.1 – 2.) [2,000 hens (without subdivisions), without cocks, 7 birds/m^2 of usable floor area, 33% of area for scratching, good availability of nests, water and food, no perches, housing without windows] with poor hen house techniques, dirty conditions in the hen house and bad animal care (ANI = 5.0). Table 16 below shows the effects on the outcome of the ANI-assessment as a result of various improvement measures, including exercise outdoors. In the horizontal rows, aspects of technique relating to the management of the birds and other more expensive constructional alterations (including a yard) are assessed, and in the vertical columns, aspects of management and bird care without constructional measures or with minor constructional measures. The improvement points as a result of the individual measures are indicated by a + sign. The cumulative effect on the ANI, i.e. the next improvement including the effects of the one preceding it, is indicated by figures in bold type (ANI value). ANI-assessment categories from 21 points upwards are based on the key given in chapter 2. (page) as follows in table 15:

Table 15: Upper welfare categories shown in chapter 2. “Introduction”

range of ANI-points total	assessment with respect to welfare	% of the range of points	grading	marking in table 16
21 to 24	fairly suitable	51 – 60	good	**light grey**
> 24 to 28	suitable	61 – 75	very good	**dark grey**
> 28	very suitable	> 75	excellent	**black**

Table 16: Effect of improvements in bird management techniques and hen house construction on the ANI rating of Example 8.1 – 2.)

2000 hens, intensive deep litter housing, poor management **ANI = 5.0** (E.g. 8.1; 2.)		install-ation of good perches, 17 cm/ bird, 50% elevated	change to wooden floor grid on dropp-ings level	install-ation of windows, 5% of floor area	0.04 m^2/bird yard; access = 0.15 cm/b. accessible during the day on a daily basis	additional 10 m^2/bird good pasture, daily during daytime, max. 120 m distance	width of exit to yard 0.3 cm instead of 0.15 cm/ bird	cover -ing of yard	nests with buckwh eat husks
	5.0	+3.0 **8.0**	+0.5 **8.5**	+1.0 **9.5**	+3.5 **13.0**	+2.5 **15.5**	+1.0 **16.5**	+0.5 **17.0**	+1.5 **18.5**
6 instead of 7 birds/m^2	+1.0 **6.0**	**9.0**	**9.5**	**10.5**	**14.0**	**16.5**	**17.5**	**18.0**	**19.5**
5 instead of 6 birds/m^2	+1.0 **7.0**	**10.0**	**10.5**	**11.5**	**15.0**	**17.5**	**18.5**	**19.0**	**20.5**
sufficient cocks	+1.0 **8.0**	**11.0**	**11.5**	**12.5**	**16.0**	**18.5**	**19.5**	**20.0**	**21.5**
good, clean litter	+1.5 **9.5**	**12.5**	**13.0**	**14.0**	**17.5**	**20.0**	**21.0**	**21.5**	**23.0**
clean facilities, in perfect condition	+2.0 **11.5**	**14.5**	**15.0**	**16.0**	**19.5**	**22.0**	**23.0**	**23.5**	**25.0**
no or only fresh carcasses	+1.0 **12.5**	**15.5**	**16.0**	**17.0**	**20.5**	**23.0**	**24.0**	**24.5**	**26.0**
good condition of feathers and skin	+1.5 **14.0**	**17.0**	**17.5**	**18.5**	**22.0**	**24.5**	**25.5**	**26.0**	**27.5**
precise management recordings	+1.0 **15.0**	**18.0**	**18.5**	**19.5**	**23.0**	**25.5**	**26.5**	**27.0**	**28.5**
Hhealth of birds very good	+1.0 **16.0**	**19.0**	**19.5**	**20.5**	**24.0**	**26.5**	**27.5**	**28.0**	**29.5**
even, bright illumination	+0.5 **16.6**	**19.5**	**20.0**	**21.0**	**24.5**	**27.0**	**28.0**	**28.5**	**30.0**
very good air quality	+1.5 **18.0**	**21.0**	**21.5**	**22.5**	**26.0**	**28.5**	**29.5**	**30.0**	**31.5**
noise insulation	+0.5 **18.5**	**21.5**	**22.0**	**23.0**	**26.5**	**29.0**	**30.0**	**30.5**	**32.0**
subdivision into groups of 500 birds	+1.0 **19.5**	**22.5**	**23.0**	**24.0**	**27.5**	**30.0**	**31.0**	**31.5**	**33.0**
very good yard facilities	+1.0	-	-	-	**28.5**	**31.0**	**32.0**	**32.5**	**34.0**
shade providers on grassland	up to + 1.5	-	-	-	-	**32.5**	**33.5**	**34.0**	**35.5**