

**Table S1 Shelter Quality Protocol measures associated with welfare principle and criteria and type of measurement (animal-based measure = ABM, resource-based measure = RBM, management-based measure = MBM).**

<b>Principle</b>	<b>Welfare criteria</b>	<b>Welfare measure (type)</b>	<b>Sub-measures</b>	<b>Unit of assessment</b>
<b>Good feeding</b>	Absence of prolonged hunger	Body condition (ABM)		Individual
		Feeding (MBM)	Feeding regime Type of diet Special diets	Shelter
	Absence of prolonged thirst	Water supply (RBM)	Type of drinkers Availability of water Cleanliness of water Safety of drinkers	Pen
<b>Good housing</b>	Comfort around resting	Bedding (RBM)	Type of bedding At least one bed/dog Safety of bedding Cleanliness of bedding	Pen
		Safety of pen (RBM)	Sharp edges	Pen
		Cleanliness of animals (ABM)		Individual
	Thermal comfort	Thermoregulation (ABM)	Signs of thermal discomfort	Individual
		Shelter from adverse weather condition (RBM)	Shelter from excessive sun; wind; rain Air circulation	Pen
	Ease of movement	Space allowance (RBM)		Pen
<b>Good health</b>	Absence of injuries	Skin condition (ABM)	Presence of wounds; hair loss areas, swelling areas; evidence of parasites	Individual
		Lameness (ABM)		Individual
	Absence of disease	Evidence of pain (ABM) Signs of diarrhea (ABM) Coughing (ABM)		Pen
		Mortality (MBM)	Euthanasia for clinical problems; behavioural problem; Deaths (other than euthanasia)	Shelter
	Absence of pain induced by management procedures	Surgeries and control pain (MBM)	Presence of operating procedures for post-surgical monitoring; Presence of hospital pens Presence of protocol of analgesia	Shelter
	<b>Appropriate behaviour</b>	Expression of social behaviours	Social housing (MBM)	Single housing pens Pair housing pens Group housing pens ( $\leq 5$ ) Group housing pens ( $> 5$ )
Expression of other behaviours		Abnormal behavior (ABM)	Repetitive and compulsive behaviours	Pen
		Barking (ABM)		Pen
		Exercise (MBM)	Exercise in outdoor areas Walking at leash	Shelter
Good human-animal relationship		Reaction to human (ABM)		Individual
		Training and rehabilitation (MBM)	Presence of training personnel for activities with dogs, and specialized personnel in behavioral rehabilitation	Shelter
Positive emotional state		Emotional state (ABM)	Qualitative Behavioural Assessment	Pen

**Table S3 Results of Delphi 1. The final weighting of measures derived from expert consensus are highlighted in bold.**

CRITERION AND MEASURES	Round 1 MEAN ± SD	Round 2 MEAN ± SD	Round 3 MEAN ± SD	Round 4 MEAN ± SD
<b>ABSENCE OF PROLONGED HUNGER</b>				
- Body condition	54 ± 14.19	56 ± 10.39	58 ± 8.82	<b>59 ± 4.14</b>
- Feeding regime	22 ± 11.42	21 ± 6.36	21 ± 5.82	<b>21 ± 3.11</b>
- Type of diet	23 ± 8.77	23 ± 7.19	21 ± 5.53	<b>20 ± 2.16</b>
<b>ABSENCE OF PROLONGED THIRST</b>				
- Availability of water	54 ± 13.19	55 ± 10.98	56 ± 9.55	<b>56 ± 1.85</b>
- Cleanliness of water	28 ± 10.19	27 ± 9.35	27 ± 8.87	<b>26 ± 3.79</b>
- Safety of drinkers	18 ± 9.22	18 ± 6.62	17 ± 5.07	<b>18 ± 2.91</b>
<b>COMFORT AROUND RESTING</b>				
- Type of bedding	15 ± 10.83	14 ± 6.99	13 ± 5.11	<b>13 ± 2.65</b>
- Presence of at least one bed per dog	22 ± 11.11	21 ± 8.48	21 ± 5.63	<b>21 ± 2.49</b>
- Safety of bedding	15 ± 6.44	16 ± 5.42	16 ± 3.79	<b>16 ± 1.67</b>
- Cleanliness/dryness of bedding	18 ± 7.90	18 ± 5.45	18 ± 4.23	<b>18 ± 1.50</b>
- Safety of the pen	14 ± 6.91	15 ± 6.23	16 ± 5.76	<b>16 ± 2.10</b>
- Dog cleanliness	15 ± 11.85	16 ± 10.81	16 ± 11.09	<b>15 ± 3.40</b>
<b>THERMAL COMFORT</b>				
- Thermoregulation	31 ± 16.72	32 ± 11.09	31 ± 9.37	<b>32 ± 2.40</b>
- Shelter from excessive exposure to sun	22 ± 7.59	21 ± 5.32	22 ± 3.74	<b>22 ± 2.90</b>
- Shelter from strong wind	14 ± 6.09	14 ± 4.10	14 ± 3.29	<b>13 ± 2.19</b>
- Shelter from rain	19 ± 7.19	18 ± 5.59	18 ± 4.51	<b>18 ± 2.11</b>
- Air circulation	14 ± 7.04	16 ± 5.85	15 ± 4.23	<b>15 ± 3.85</b>
<b>ABSENCE OF INJURIES</b>				
- Presence of wounds	26 ± 7.98	26 ± 5.14	<b>27 ± 4.35</b>	-
- Presence of hair loss areas	16 ± 5.76	15 ± 4.37	<b>15 ± 2.83</b>	
- Presence of swelling areas	20 ± 4.25	20 ± 3.59	<b>20 ± 1.62</b>	
- Evidence of ectoparasities	18 ± 5.09	18 ± 4.32	<b>18 ± 3.26</b>	
- Presence of lameness	20 ± 5.19	21 ± 3.40	<b>20 ± 2.89</b>	
<b>ABSENCE OF DISEASE</b>				
- Presence of diarrhoea	28 ± 7.58	28 ± 5.50	27 ± 5.19	<b>27 ± 2.23</b>
- Evidence of coughing	27 ± 8.45	27 ± 7.41	26 ± 5.21	<b>26 ± 3.10</b>
- Evidence of pain	45 ± 12.55	46 ± 11.07	46 ± 9.31	<b>46 ± 4.56</b>
<b>EXPRESSION OF OTHER BEHAVIOURS</b>				
- Possibility and frequency of exercise in outdoor fenced areas	33 ± 9.88	33 ± 9.24	33 ± 6.24	<b>33 ± 2.19</b>
- Possibility and frequency of walking on a leash	29 ± 9.08	30 ± 8.05	30 ± 7.82	<b>29 ± 1.91</b>
- Presence of abnormal behaviours	38 ± 13.66	37 ± 12.87	37 ± 10.13	<b>38 ± 1.85</b>
<b>ABSENCE OF PAIN INDUCED BY MANAGEMENT PROCEDURES</b>				
- Presence of operating procedures for post-surgical pain monitoring	34 ± 9.80	34 ± 6.35	33 ± 5.30	<b>33 ± 2.17</b>
- Presence of hospital pens	27 ± 11.38	26 ± 7.95	28 ± 4.80	<b>28 ± 1.89</b>
- Presence of protocols for analgesia	39 ± 9.14	39 ± 5.93	39 ± 4.25	<b>29 ± 1.36</b>
<b>GOOD HUMAN-ANIMAL RELATIONSHIP</b>				
- Reaction to people				
- Presence of qualified personnel for dog training	41 ± 16.25	44 ± 14.39	44 ± 13.11	<b>45 ± 3.75</b>
- Presence of qualified personnel for behavioural rehabilitation	27 ± 9.69	26 ± 8.15	27 ± 6.19	<b>27 ± 1.53</b>
	32 ± 12.10	30 ± 10.88	29 ± 8.53	<b>28 ± 3.32</b>
<b>GOOD FEEDING</b>				

-	Criterion of absence of prolonged hunger	46 ± 8.02	<b>45 ± 4.71</b>	-	-
-	Criterion of absence of prolonged thirst	54 ± 8.02	<b>55 ± 4.71</b>		
<b>GOOD HOUSING</b>					
-	Criterion of comfort around resting	33 ± 6.38	32 ± 3.83	<b>31 ± 1.76</b>	-
-	Criterion of thermal comfort	34 ± 8.73	34 ± 6.28	<b>34 ± 2.63</b>	
-	Criterion of ease of movement	33 ± 8.12	34 ± 5.86	<b>35 ± 3.58</b>	
<b>GOOD HEALTH</b>					
-	Criterion of absence of injuries	34 ± 8.63	33 ± 7.44	33 ± 5.45	<b>33 ± 1.88</b>
-	Criterion of absence of disease	33 ± 8.44	36 ± 7.85	36 ± 6.72	<b>36 ± 1.54</b>
-	Criterion of absence of pain induced by management procedures	34 ± 10.82	33 ± 9.31	31 ± 7.97	<b>31 ± 1.90</b>
<b>APPROPRIATE BEHAVIOUR</b>					
-	Criterion of expression of social behaviour	27 ± 7.95	26 ± 5.60	26 ± 2.97	<b>26 ± 1.74</b>
-	Criterion of expression of other behaviour	19 ± 7.43	19 ± 5.29	20 ± 4.55	<b>20 ± 1.48</b>
-	Criterion of good human animal relationship	26 ± 7.37	27 ± 7.25	27 ± 5.97	<b>27 ± 1.26</b>
-	Criterion of positive emotional state	29 ± 10.01	28 ± 7.40	27 ± 5.24	<b>27 ± 2.35</b>
<b>ANIMAL WELFARE ASSESSMENT</b>					
-	Principle of good feeding	23 ± 3.49	<b>24 ± 2.65</b>	-	-
-	Principle of good housing	23 ± 3.38	<b>23 ± 2.16</b>		
-	Principle of good health	26 ± 3.42	<b>26 ± 2.81</b>		
-	Principle of appropriate behaviour	28 ± 5.85	<b>27 ± 3.63</b>		

**Table S4 Results of Delphi 2.  $0 \leq V \leq 0.5$ = good degree of consensus, no need for additional round;  $0.5 \leq V \leq 0.8$ = less than satisfactory degree of consensus, possible need for additional round;  $V > 0.8$ = poor degree of consensus, definite need for additional round (English & Kernan 1976).\*This result was considered acceptable by the authors**

<b>Categorical variables</b>	<b>Welfare measures/Welfare criteria/Welfare principles</b>	<b>Mean and SD</b>	<b>Variable coefficient</b>
<b>Body condition score</b> - Adequate - Too heavy - Too thin	Body condition/Absence of prolonged hunger/Good feeding	98 ± 4.21 39 ± 11.25 20 ± 6.39	0.04 0.2 0.3
<b>Feeding regime</b> - Once a day - Twice a day - Ad libitum	Feeding/ Absence of prolonged hunger/Good feeding	44 ± 10.74 95 ± 9.71 31 ± 11.71	0.2 0.1 0.5
<b>Type of pen</b> - Single pen - Pair pen - Group pen (≤ 5 dogs) - Group pen (> 5 dogs)	Social housing/Expression of social behaviours/Appropriate behaviours	17 ± 6.5 77 ± 10.91 67 ± 10.71 31 ± 13.42	0.3 0.1 0.1 0.4
<b>Type of bedding</b> - Kennel - Basket - Other (fabric, mattress, carpet, platform etc.)	Bedding/Comfort around resting/Good housing	90 ± 9.71 54 ± 14.91 34 ± 9.81	0.1 0.2 0.2
<b>Access to outdoor fenced area</b> - Daily (> 3h) - Daily (≤ 3h) - Weekly - No or not regular	Exercise/Expression of other behaviours/Appropriate behaviours	95 ± 7.07 70 ± 14.23 15 ± 7.07 3 ± 4.3	0.07 0.2 0.4 1.32
<b>Walking on leash</b> - Daily - Weekly - No or not regular	Exercise/ Expression of other behaviours/Appropriate behaviours	96 ± 5.16 35 ± 16.95 3 ± 4.74	0.05 0.4 1.39
<b>Reaction to human</b> - No signs - Only fear - Defensive/offensive aggression	Reaction to human/Good human-animal relationship	93 ± 8.56 28 ± 16.95 14 ± 4.74	0.09 0.72* 0.46
<b>Qualitative behavioural assessment</b> - Relaxed - Comfortable - Curious - Excited - Sociable - Playful - Depressed - Alert - Nervous - Anxious - Fearful - Hesitant - Aggressive	Emotional state/Positive emotional state/Appropriate behaviour	85 ± 13.68 82 ± 24.17 73 ± 20.27 61 ± 30.42 89 ± 9.08 72 ± 23.85 71 ± 34.15 58 ± 19.66 49 ± 38.01 69 ± 32.85 73 ± 28.37 53 ± 21.57 71 ± 42.62	0.1 0.2 0.2 0.3 0.1 0.2 0.3 0.2 0.4 0.3 0.3 0.2 0.4