

# Appendix: Agricultural Animal Pen Sizes

## **Beef Cattle: SOC 33-100**

*Guide for the Care and Use of Laboratory Animals:*

Animals/Enclosure	Weight, kg	Floor Area/Animal, ft <sup>2</sup> (m <sup>2</sup> )
1	<75	24.0 (2.16)
	Up to 200	48.0 (4.32)
	Up to 350	72.0 (6.48)
	Up to 500	96.0 (8.64)
	Up to 650	124.0 (11.16)
	>650 <sup>c</sup>	≥144.0 (≥12.96)
2-5	<75	20.0 (1.8)
	Up to 200	40.0 (3.6)
	Up to 350	60.0 (5.4)
	Up to 500	80.0 (7.2)
	Up to 650	105.0 (9.45)
	>650 <sup>c</sup>	≥120.0 (≥10.8)
>5	<75	18.0 (1.62)
	Up to 200	36.0 (3.24)
	Up to 350	54.0 (4.86)
	Up to 500	72.0 (6.48)
	Up to 650	93.0 (8.37)
	>650 <sup>c</sup>	≥108.0 (≥9.72)

*Guide for the Care and Use of Agricultural Animals in Research and Teaching:*

Area or space	Calves, 180 to 380 kg (400 to 800 lb)		Finishing cattle, 360 to 545 kg (800 to 1200 lb)		Bred heifers, 360 kg (800 lb)	
	m <sup>2</sup>	ft <sup>2</sup>	m <sup>2</sup>	ft <sup>2</sup>	m <sup>2</sup>	ft <sup>2</sup>
<b>Floor or ground area</b>						
Open lots (no barn)						
Unpaved lots with mound (includes mound space)	14.0 to 28.0	150 to 300	23.2 to 46.5	250 to 500	23.2 to 46.5	250 to 500
Mound space, 25% slope	1.9 to 2.3	20 to 25	2.8 to 3.3	30 to 35	2.8 to 3.3	30 to 35
Unpaved lot, 4 to 8% slope, no mound	28.0 to 55.8	300 to 600	37.2 to 74.4	400 to 800	37.2 to 74.4	400 to 800
Paved lot, 2 to 4% slope	3.7 to 4.7	40 to 50	4.7 to 5.6	50 to 60	4.7 to 5.6	50 to 60
<b>Barns (unheated cold housing)</b>						
Open front with dirt lot	1.4 to 1.9	15 to 20	1.9 to 2.3	20 to 25	1.9 to 2.3	20 to 25
Enclosed, bedded pack	1.9 to 2.3	20 to 25	2.8 to 3.3	30 to 35	2.8 to 3.3	30 to 35
Enclosed, slotted floor	1.1 to 1.7	12 to 18	1.7 to 2.3	18 to 25	1.7 to 2.3	18 to 25
<b>Feeder space when fed:</b>						
Once daily	45.7 to 55.9	18 to 22	55.9 to 66.0	22 to 26	55.9 to 66.0	22 to 26
Twice daily	22.9 to 27.9	9 to 11	27.9 to 33.0	11 to 13	27.9 to 33.0	11 to 13
Free choice grain	7.6 to 10.2	3 to 4	10.2 to 15.2	4 to 6	10.2 to 15.2	4 to 6
Self-fed roughage	22.9 to 25.4	9 to 10	25.4 to 27.9	10 to 11	27.9 to 30.5	11 to 12
	Cows, 455 kg (1,000 lb)		Cows, 590 kg (1,300 lb)		Bulls, 680 kg (1,500 lb)	
<b>Floor or ground area</b>						
Open lots (no barn)						
Unpaved lots with mound (includes mound space)	18.6 to 46.5	200 to 500	28.0 to 46.5	300 to 500	46.5	500
Mound space, 25% slope	3.7 to 4.2	40 to 45	3.7 to 4.2	40 to 45	4.7 to 5.6	50 to 60
Unpaved lot, 4 to 8% slope, no mound	32.5 to 74.3	350 to 800	32.5 to 74.3	350 to 800	74.3	800
Paved lot, 2 to 4% slope	5.6 to 7.0	60 to 75	5.6 to 7.0	60 to 75	9.3 to 11.6	100 to 125
<b>Barns (unheated cold housing)</b>						
Open front with lot	1.9 to 2.3	20 to 25	2.3 to 2.8	25 to 30	3.7	40
Enclosed, bedded pack	3.3 to 3.7	35 to 40	3.7 to 4.7	40 to 50	4.2 to 4.7	45 to 50
Enclosed, slotted floor	1.9 to 2.3	20 to 25	2.0 to 2.6	22 to 28	2.8	30
<b>Feeder space when fed:</b>						
Once daily, limited feed access	61.0 to 76.2	24 to 30	66.0 to 76.2	26 to 30	76.2 to 91.4	30 to 36
Twice daily, limited feed access	30.5 to 38.1	12 to 15	30.5 to 38.1	12 to 15	—	—
High-concentrate diet, ad libitum	12.7 to 15.2	5 to 6	12.7 to 15.2	5 to 6	—	—
High-forage diet, ad libitum	30.5 to 33.0	12 to 13	33.0 to 35.6	13 to 14	—	—

## Dairy Cattle: SOC 33-200

*Guide for the Care and Use of Laboratory Animals:* See beef cattle

*Guide for the Care and Use of Agricultural Animals in Research and Teaching:*

Component	Option	Size		
Individual calves Until 2 mo [to 91 kg (to 200 lb)] Until 7 mo [to 182 kg (to 400 lb)] Groups <sup>3</sup> of weaned calves [182 kg (<400 lb; 3 to 12/group)]	Hutches and yard or tether	1.5 to 3 m <sup>2</sup> /head	6 to 12 ft <sup>2</sup> /head	
	Bedded pen	2.2 to 3 m <sup>2</sup> /head	24 to 32 ft <sup>2</sup> /head	
	Stall <sup>2</sup>	0.6 to 0.8 × 1.5 to 1.8 m <sup>2</sup> /head	10 to 15 ft <sup>2</sup> /head	
	Movable shed (super calf hutch) plus yard	2 m <sup>2</sup> /head	21 ft <sup>2</sup> /head	
	Inside pen	2.3 to 2.8 m <sup>2</sup> /head	25 to 30 ft <sup>2</sup> /head	
	Bedded pack	3.1 × 4.9 to 6.1 m	10 × 16 to 20 ft	
	Scraped alley	3.1 × 2.4 to 3.1 m	10 × 8 to 10 ft	
	Groups <sup>3</sup> of heifers in pens, 6 to 20/group 181 to 454 kg (400 to 1,000 lb) 34 to 136 kg (75 to 300 lb)	With free stalls (see Table 7-2)		
		With bedded pack	8 to 12 m <sup>2</sup> /t	4 to 6 ft <sup>2</sup> /cwt
			1.5 to 5.6 m <sup>2</sup> /head	16 to 60 ft <sup>2</sup> /head
		5. to 8 m <sup>2</sup> /t	2.5 to 4 ft <sup>2</sup> /cwt	
With slatted floor <sup>4</sup>		1.5 to 2.3 m <sup>2</sup> /head	16 to 25 ft <sup>2</sup> /head	
With counterslope Floors and litter alley		6 to 8 m <sup>2</sup> /t	3 to 4 ft <sup>2</sup> /cwt	
Dry cows and heifers [454 kg (>1,000 lb)]	Bedded pack and paved alley	1.5 to 3 m <sup>2</sup> /head	16 to 30 ft <sup>2</sup> /head	
		8 to 12 m <sup>2</sup> /t	4 to 6 ft <sup>2</sup> /cwt	
		4 to 9 m <sup>2</sup> /head	40 to 96 ft <sup>2</sup> /head	
Maternity or isolation pens (5% of cows) <sup>5</sup>	With bedded nonslip floors	9.3 to 14.9 m <sup>2</sup> /head	100 to 160 ft <sup>2</sup> /head	
		3.1 × 3.1 to 3.7 × 4.3 m	10 × 10 to 12 × 14 ft	
Individual mature bulls	Rugged pens	13 to 22.3 m <sup>2</sup> /head	140 to 240 ft <sup>2</sup> /head	
		3.1 × 4.3 m	10 × 14 ft or larger	
		1.4 × 2.5 to 2.6 m to 1.8 × 360 m	54 × 97 to 102 in to 72 × 188 in	
Milking cows	Free stalls (see Table 7-2)	(see Table 7-2)		
	Tie stalls (see Table 7-2)	(see Table 7-2)		
	Paved lots	9 m <sup>2</sup> /head	100 ft <sup>2</sup> /head	
	Unpaved corrals	46 m <sup>2</sup> /head	500 ft <sup>2</sup> /head	

Target weight	Approximate age <sup>2</sup> (mo)	Free stall <sup>3</sup>	Tie stall <sup>3</sup>
118 kg (260 lb)	4	61 × 122 cm (24 × 48 in) <sup>4</sup>	NI <sup>5</sup>
182 kg (400 lb)	6	69 × 122 cm (27 × 48 in)	NI
236 kg (520 lb)	8	76 × 137 to 152 cm (30 × 54 to 60 in)	NI
327 kg (720 lb)	12	86 to 91 × 152 to 168 cm (34 to 36 × 60 to 66 in)	NI
377 kg (830 lb)	16	91 to 107 × 168 to 198 cm (36 to 42 × 66 to 78 in)	NI
454 kg (1,000 lb)	20	99 × 183 cm (39 × 72 in)	122 × 152 to 175 cm (48 × 60 to 69 in)
500 kg (1,100 lb)	24	107 × 198 to 213 cm (42 × 78 to 84 in)	122 × 160 to 175 cm (48 × 63 to 69 in)
545 kg (1,200 lb)	26	114 × 208 to 213 cm (45 × 82 to 84 in)	122 × 168 to 175 cm (48 × 66 to 69 in)
636 kg (1,400 lb)	48	122 × 213 to 218 cm (48 × 84 to 86 in)	137 × 183 cm (54 × 72 in)
727 kg (1,600 lb)	60	122 × 229 cm (48 × 90 in)	152 × 183 to 198 cm (60 × 72 to 78 in)

**Horses: SOC 33-300***Guide for the Care and Use of Laboratory Animals:*

Animals/Enclosure	Weight, kg	Floor Area/Animal, ft <sup>2</sup> (m <sup>2</sup> )
Horses	—	144.0 (12.96)
Ponies		
1-4	—	72.0 (6.48)
>4/Pen	≤200	60.0 (5.4)
	>200	≥72.0 (≥6.48)

*Guide for the Care and Use of Agricultural Animals in Research and Teaching:*

Area	m	ft
Indoor facilities		
Box stall: 1.8 m <sup>2</sup> /100 kg (9 ft <sup>2</sup> /100 lb) of body weight (BW)	3.7 × 3.7	12 × 12
Straight or tie stall, including manger: 0.82 m <sup>2</sup> /100 kg (4 ft <sup>2</sup> /100 lb) of BW	1.5 × 3.7 <sup>2</sup>	5 × 12
Alleys, width		
Between rows of stalls	2.4-4.3	up to 14 ft
Behind rows of tie stalls	1.8	6
In front of rows of tie stalls	1.2	4
Outdoor facilities		
Run-in shed (per 1,000-lb horse; up to 2 horses)	3.3 × 3.3	11 × 11
Fencing height for		
Horses	1.4-1.8	4.5-6.0
Ponies	1.1-1.5	3.5-5.0
Outdoor pen (for single horse)	3.7 × 3.7	12 × 12
Pasture per horse	≥0.4 ha	≥1 acre

## Sheep and Goats: SOC 33-400, 33-500

### Guide for the Care and Use of Laboratory Animals:

Animals/Enclosure	Weight, kg	Floor Area/Animal, ft <sup>2</sup> (m <sup>2</sup> )
Sheep and Goats		
1	<25	10.0 (0.9)
	Up to 50	15.0 (1.35)
	>50	≥20.0 (≥1.8)
2-5	<25	8.5 (0.76)
	Up to 50	12.5 (1.12)
	>50	≥17.0 (≥1.53)
>5	<25	7.5 (0.67)
	Up to 50	11.3 (1.02)
	>50	≥15.0 (≥1.35)

### Guide for the Care and Use of Agricultural Animals in Research and Teaching:

Facility	Floor type	Rams (65–90 kg, 180–300 lb)		Dry ewes (65–90 kg, 150–200 lb)		Ewes and lambs (additional creep area required)		Lamb creep area (2–14 kg, 5–30 lb)		Feeder lambs (14–50 kg, 30–110 lb)	
		m <sup>2</sup>	ft <sup>2</sup>	m <sup>2</sup>	ft <sup>2</sup>	m <sup>2</sup>	ft <sup>2</sup>	m <sup>2</sup>	ft <sup>2</sup>	m <sup>2</sup>	ft <sup>2</sup>
Building											
floor area	Solid	1.86–2.79	20–30	1.12–1.49	12–16	1.39–1.86	15–20 <sup>3</sup>	0.14–0.19	1.5–2.0	0.74–0.93	8–10
	Slotted	1.30–1.86	14–20	0.74–0.93	8–10	0.93–1.12	10–12 <sup>3</sup>	0.14–0.19	1.5–2.0	0.37–0.46	4–5
Lot area	Dirt	2.32–3.72	25–40	2.32–3.72	25–40	2.79–4.65	30–50	—	—	1.86–2.79	20–30
	Paved	1.49	16	1.49	16	1.86	20	—	—	0.93	10
Feeder space											
		cm	in	cm	in	cm	in	cm	in	cm	in
Limit-fed		30.48	12	40.64–50.80	16–20	40.64–50.80	16–20	22.86–30.48	9–12	22.86–30.48	9–12
Self-fed		15.24	6	10.16–15.24	4–6	15.24–20.30	6–8	2.54–5.08	1–2	2.54–5.08	1–2

**Swine: SOC 33-600**

*Guide for the Care and Use of Laboratory Animals:*

Animals/Enclosure	Weight, kg	Floor Area/Animal, ft <sup>2</sup> (m <sup>2</sup> )
1	<15	8.0 (0.72)
	Up to 25	12.0 (1.08)
	Up to 50	15.0 (1.35)
	Up to 100	24.0 (2.16)
	Up to 200	48.0 (4.32)
	>200	≥60.0 (≥5.4)
2-5	<25	6.0 (0.54)
	Up to 50	10.0 (0.9)
	Up to 100	20.0 (1.8)
	Up to 200	40.0 (3.6)
	>200	≥52.0 (≥4.68)
>5	<25	6.0 (0.54)
	Up to 50	9.0 (0.81)
	Up to 100	18.0 (1.62)
	Up to 200	36.0 (3.24)
	>200	≥48.0 (≥4.32)

*Guide for the Care and Use of Agricultural Animals in Research and Teaching:*

Stage of production	Individual pigs (per pig)		Groups of pigs (per pig) <sup>2</sup>	
	(m <sup>2</sup> )	(ft <sup>2</sup> )	(m <sup>2</sup> )	(ft <sup>2</sup> )
Litter and lactating sow, pen	3.15	35	—	—
Litter and lactating sow, sow portion of crate	1.26	14	—	—
Nursery, 3 to 27 kg (7 to 60 lb) of BW	0.54	6	0.16–0.37	1.7–4.0
Growing, 27 to 57 kg (60 to 125 lb) of BW	0.90	10	0.37–0.56	4.0–6.0
Finishing, 57 to 104 kg (125 to 230 lb) of BW	1.26	14	0.56–0.74	6.0–8.0
Late finishing, 105 to 125 kg (231 to 275 lb) of BW	1.26	14	0.74–0.84	8.0–9.0
Mature adults <sup>3</sup>	1.26	14	1.49	16.0

**Poultry: SOC 34-100**

*Guide for the Care and Use of Laboratory Animals:*

Animals	Weight, kg	Floor area/animal, ft <sup>2</sup> (m <sup>2</sup> )	Height
Pigeons	—	0.8 (0.07)	Cage height should be sufficient for the animals to comfortably stand erect with their feet on the floor.
Quail	—	0.25 (0.023)	
Chickens	<0.25	0.25 (0.023)	
	Up to 0.5	0.50 (0.046)	
	Up to 1.5	1.00 (0.093)	
	Up to 3.0	2.00 (0.186)	
	>3.0	≥3.00 (≥0.279)	

*Guide for the Care and Use of Agricultural Animals in Research and Teaching:*

Egg-laying chickens:

Type of housing and age (wk)	White Leghorns				Mini Leghorns				Medium-weight breeds			
	Female		Male		Female		Male		Female		Male	
	(cm <sup>2</sup> )	(in <sup>2</sup> )	(cm <sup>2</sup> )	(in <sup>2</sup> )	(cm <sup>2</sup> )	(in <sup>2</sup> )	(cm <sup>2</sup> )	(in <sup>2</sup> )	(cm <sup>2</sup> )	(in <sup>2</sup> )	(cm <sup>2</sup> )	(in <sup>2</sup> )
Pen <sup>2</sup>												
0 to 6	464	72	606	94	418	65	545	85	510	79	667	103
6 to 18	929	144	1,206	187	697	108	905	140	1,068	166	1,387	215
>18 Litter <sup>3</sup>	1,625	252	2,116	328	1,219	189	1,587	246	1,869	290	2,433	377
>18 S&L, W&L <sup>3</sup>	1,393	216	1,812	281	1,045	162	1,359	211	1,602	248	2,084	323
>18 All-S, All W	1,161	180	1,509	234	871	135	1,132	176	1,335	207	1,735	269
Cage <sup>4</sup>												
0 to 3	97	15	129	20	87	14	116	18	107	17	142	22
3 to 6	155	24	200	31	140	22	180	28	171	26	220	34
6 to 12	232	36	303	47	174	27	227	35	267	41	348	54
12 to 18	310	48	400	62	233	36	300	47	357	55	460	71
18 to 22	387	60	503	78	290	45	377	59	445	69	578	90
>22	464	72	606	94	348	54	455	71	534	83	697	108
Aviary <sup>5</sup>												
>22									1,155	173		

## Meat Chickens:

Bird type, flooring, and body weight, kg (lb)	Approximate age (d)	Floor area/bird	
		(cm <sup>2</sup> )	(in <sup>2</sup> )
Commercial broilers on 100% litter or multiple bird cages <sup>2</sup>			
<0.3 (<0.7)	0 to 13	248	38
0.3 to 0.6 (0.7 to 1.3)	14 to 18	342	53
0.6 to 0.9 (1.3 to 2.0)	19 to 24	432	67
0.9 to 1.2 (2.0 to 2.6)	25 to 27	516	80
1.2 to 1.5 (2.6 to 3.3)	28 to 31	606	94
1.5 to 1.8 (3.3 to 4.0)	32 to 35	703	109
1.8 to 2.1 (4.0 to 4.6)	36 to 39	780	121
2.1 to 2.4 (4.6 to 5.3)	40 to 43	871	135
2.4 to 2.7 (5.3 to 6.0)	44 to 48	948	147
2.7 to 3.3 (6.0 to 7.2)	49 to 57	1,019	158
>3.3 (>7.2)	>58	1,097	170
Broiler breeder females or mixed ratio of 1 male to 10 females on 100% litter			
<0.3 (<0.7)	0 to 21	320	50
0.3 to 0.6 (0.7 to 1.3)	22 to 42	690	107
0.6 to 0.9 (1.3 to 2.0)	43 to 63	870	135
0.9 to 1.2 (2.0 to 2.6)	64 to 84	1,058	164
1.2 to 1.5 (2.6 to 3.3)	85 to 105	1,238	192
1.5 to 1.8 (3.3 to 4.0)	106 to 126	1,426	221
1.8 to 2.1 (4.0 to 4.6)	127 to 140	1,612	250
2.1 to 2.4 (4.6 to 5.3)	141 to 150	1,740	270
2.4 to 2.7 <sup>3</sup> (5.3 to 5.6)	151 to 160	1,860	288
Individually caged adult broiler breeder female <sup>2</sup>			
>2.4 (>5.3)	>151	1,161	180
Broiler breeder males only on 100% litter in multiple bird pens			
<0.3 (<0.7)	0 to 14	320	50
0.3 to 0.6 (0.7 to 1.3)	15 to 28	690	107
0.6 to 0.9 (1.3 to 2.0)	29 to 43	870	135
0.9 to 1.2 (2.0 to 2.6)	44 to 61	1,058	164
1.2 to 1.5 (2.6 to 3.3)	62 to 77	1,238	192
1.5 to 1.8 (3.3 to 4.0)	78 to 92	1,426	221
1.8 to 2.1 (4.0 to 4.6)	93 to 104	1,612	250
2.1 to 2.4 (4.6 to 5.3)	105 to 120	1,740	270
2.4 to 2.7 (5.3 to 6.0)	121 to 138	1,860	288
2.7 to 3.0 (6.0 to 7.2)	139 to 149	1,974	306
3.0 to 3.3 (6.1 to 7.2)	150 to 161	2,090	324
>3.3 (>7.2)	>162	2,195	340
Individually caged adult broiler breeder male <sup>2</sup>			
>3.3 (>7.2)	>162	1,393	216

Ducks (Pekin):

Bird type and age (wk)	Litter floor <sup>2</sup>		Wire floor	
	(cm <sup>2</sup> )	(in <sup>2</sup> )	(cm <sup>2</sup> )	(in <sup>2</sup> )
Growing ducks in multiple bird pens				
1	232	36	232	36
2	464	72	439	68
3	839	130	651	101
4	1,116	173	974	151
5	1,393	216	1,187	184
6	1,671	259	1,413	219
7	1,858	288	1,625	252
Developing breeders in multiple bird pens <sup>3</sup>				
7 to 28	2,322	360		
Breeders in multiple bird pens				
>28	3,251	504		
Individually caged breeder female or male <sup>4</sup>				
>28	3,715	576		