

Hy-Line[®]

PINK

PERFORMANCE STANDARDS GUIDE

COMMERCIAL LAYERS
CONVENTIONAL SYSTEMS



Hy-Line[®]

Use of the Performance Guide

The genetic potential of Hy-Line Pink Commercial can only be realized if good poultry husbandry practices and management are used. This management guide outlines successful flock management programmes for Hy-Line Variety Pink Commercial based on field experience compiled by Hy-Line International and using an extensive commercial layer flock database of Hy-Line flocks from all parts of the world. Hy-Line International Management Guides are periodically updated as new performance data and/or nutrition information become available.

The information and suggestions contained in this management guide should be used for guidance and educational purposes only, recognising that local environmental and disease conditions may vary and a guide cannot cover all possible circumstances. While every attempt has been made to ensure that the information presented is accurate and reliable at the time of publication, Hy-Line International cannot accept responsibility for any errors, omissions or inaccuracies in such information or management suggestions. Further, Hy-Line International does not warrant or make any representations or guarantees regarding the use, validity, accuracy, or reliability of, or flock performance or productivity resulting from the use of, or otherwise respecting, such information or management suggestions. In no event shall Hy-Line International be liable for any special, indirect or consequential damages or special damages whatsoever arising out of or in connection with the use of the information or management suggestions contained in this management guide.

Always consult hyline.com for the latest performance, nutrition, and management information.



Hy-Line Pink
Online Management Guide

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Summary of Performance Standards

REARING PERIOD (TO 17 WEEKS):	
Livability	98.0%
Feed Consumed	5.79–6.18 kg
Body Weight at 17 Weeks	1392–1458 g
LAYING PERIOD (TO 100 WEEKS):	
Percent Peak	93.5–98.0%
Hen-Day Eggs to 60 Weeks	256.9–271.8
Hen-Day Eggs to 100 Weeks	482.1–513.5
Hen-Housed Eggs to 60 Weeks	253.5–268.3
Hen-Housed Eggs to 100 Weeks	466.9–497.2
Livability to 60 Weeks	97.2%
Livability to 100 Weeks	91.7%
Days to 50% Production (from hatch)	141 days
Average Egg Weight at 26 Weeks	55.7–58.3 g/egg
Average Egg Weight at 32 Weeks	59.3–62.1 g/egg
Average Egg Weight at 70 Weeks	62.7–65.8 g/egg
Average Egg Weight at 100 Weeks	63.2–66.4 g/egg
Total Egg Mass per Hen-Housed (18–80 weeks)	22.8–24.2 kg
Total Egg Mass per Hen-Housed (18–100 weeks)	29.2–31.1 kg
Body Weight at 26 Weeks	1782–1872 g
Body Weight at 32 Weeks	1851–1950 g
Body Weight at 70 Weeks	1871–2002 g
Body Weight at 100 Weeks	1882–2039 g
Freedom From Egg Inclusions	Excellent
Shell Strength	Excellent
Shell Color at 38 Weeks	46
Shell Color at 56 Weeks	43
Shell Color at 70 Weeks	41
Haugh Units at 38 Weeks	93.0
Haugh Units at 56 Weeks	86.9
Haugh Units at 70 Weeks	83.0
Average Daily Feed Consumption (19–100 weeks)	105.4–112.3 g/day per bird
Feed Conversion Rate, kg Feed/kg Eggs (20–60 weeks)	1.99–2.07
Feed Conversion Rate, kg Feed/kg Eggs (20–100 weeks)	2.05–2.13
Feed Utilization, kg Egg/kg Feed (20–60 weeks)	0.48–0.50
Feed Utilization, kg Egg/kg Feed (20–100 weeks)	0.47–0.49
Feed Consumption per Dozen Eggs (20–60 weeks)	1.43–1.49 kg
Feed Consumption per Dozen Eggs (20–100 weeks)	1.49–1.55 kg
Skin Color	Yellow
Condition of Droppings	Dry

Rearing Period Performance Table

AGE (weeks)	MORTALITY Cumulative (%)	BODY WEIGHT (g)	FEED INTAKE (g / bird per day)	CUMULATIVE FEED INTAKE (g to date)	WATER CONSUMP- TION (ml / bird/ day)	UNIFORMITY (Cage)
1	0.70	71 – 79	14 – 15	97 – 107	21 –31	>85%
2	0.90	120 – 132	18 – 20	223 – 246	27 –40	
3	1.00	186 – 204	23 – 25	382 – 420	34 –50	
4	1.07	264 – 289	28 – 30	577 – 633	42 –61	>80%
5	1.14	352 – 384	33 – 36	808 – 886	50 –72	
6	1.21	447 – 486	38 – 42	1078 – 1179	58 –84	
7	1.29	547 – 592	44 – 47	1384 – 1510	66 –95	
8	1.36	647 – 698	49 – 52	1724 – 1877	73 –105	
9	1.43	747 – 803	52 – 56	2089 – 2271	78 –112	
10	1.50	844 – 904	56 – 60	2483 – 2692	84 –120	
11	1.57	935 – 999	60 – 64	2900 – 3138	89 –127	>85%
12	1.64	1022 – 1088	63 – 67	3338 – 3604	94 –133	
13	1.71	1104 – 1171	65 – 69	3793 – 4088	98 –138	
14	1.79	1181 – 1250	67 – 71	4265 – 4587	101 –143	
15	1.86	1254 – 1322	70 – 74	4754 – 5102	105 –147	
16	1.93	1324 – 1391	72 – 76	5258 – 5632	108 –151	
17	2.00	1392 – 1458	75 – 79	5785 – 6184	113 –158	

Production Period Performance Table

AGE (weeks)	% HEN-DAY Current	HEN-DAY EGGS Cumulative	HEN- HOUSED EGGS Cumulative	MORT- ALITY Cumulative (%)	BODY WEIGHT (g)	FEED INTAKE (g / bird / day)	WATER CONSUMP- TION (ml / bird / day)	HEN- HOUSED EGG MASS Cumulative (kg)	AVG. EGG WEIGHT (g / egg)
18	1.5 – 1.7	0.1 – 0.1	0.1 – 0.1	0.16	1456 – 1524	79 – 83	118 – 165	–	44.0 – 46.0
19	26.6 – 29.5	2.0 – 2.2	2.0 – 2.2	0.20	1516 – 1588	83 – 87	125 – 174	0.1 – 0.1	45.8 – 47.9
20	45.3 – 49.9	5.1 – 5.7	5.1 – 5.7	0.23	1572 – 1648	88 – 92	131 – 183	0.2 – 0.3	47.2 – 49.5
21	61.3 – 66.9	9.4 – 10.4	9.4 – 10.3	0.27	1624 – 1703	92 – 96	138 – 193	0.5 – 0.5	48.7 – 51.0
22	74.0 – 80.3	14.6 – 16.0	14.6 – 15.9	0.30	1670 – 1751	96 – 101	144 – 201	0.7 – 0.8	50.2 – 52.5
23	82.7 – 89.1	20.4 – 22.2	20.3 – 22.2	0.34	1709 – 1793	99 – 104	149 – 209	1.0 – 1.1	51.7 – 54.1
24	87.8 – 93.9	26.5 – 28.8	26.5 – 28.7	0.38	1738 – 1824	102 – 107	153 – 213	1.4 – 1.5	53.1 – 55.6
25	90.6 – 96.2	32.9 – 35.5	32.8 – 35.4	0.41	1762 – 1850	104 – 109	156 – 218	1.7 – 1.9	54.4 – 57.0
26	92.2 – 97.2	39.3 – 42.3	39.2 – 42.2	0.45	1782 – 1872	105 – 111	158 – 221	2.1 – 2.2	55.7 – 58.3
27	93.2 – 97.6	45.9 – 49.2	45.7 – 49.0	0.49	1800 – 1891	106 – 112	159 – 223	2.5 – 2.6	56.7 – 59.3
28	93.5 – 97.9	52.4 – 56.0	52.2 – 55.8	0.54	1815 – 1908	107 – 112	160 – 225	2.8 – 3.0	57.4 – 60.2
29	93.5 – 98.0	59.0 – 62.9	58.7 – 62.6	0.58	1828 – 1923	107 – 113	161 – 225	3.2 – 3.4	58.1 – 60.8
30	93.5 – 98.0	65.5 – 69.7	65.2 – 69.4	0.63	1839 – 1935	107 – 113	161 – 226	3.6 – 3.9	58.6 – 61.3
31	93.4 – 98.0	72.0 – 76.6	71.7 – 76.3	0.67	1846 – 1944	107 – 113	161 – 226	4.0 – 4.3	59.0 – 61.8
32	93.3 – 97.9	78.6 – 83.5	78.2 – 83.1	0.72	1851 – 1950	107 – 113	161 – 226	4.4 – 4.7	59.3 – 62.1
33	93.2 – 97.8	85.1 – 90.3	84.7 – 89.9	0.77	1854 – 1954	107 – 113	161 – 226	4.8 – 5.1	59.6 – 62.4
34	93.0 – 97.7	91.6 – 97.1	91.1 – 96.6	0.82	1856 – 1957	107 – 113	161 – 226	5.2 – 5.5	59.9 – 62.7
35	92.9 – 97.6	98.1 – 104.0	97.6 – 103.4	0.87	1858 – 1959	107 – 113	161 – 226	5.6 – 5.9	60.1 – 63.0
36	92.7 – 97.5	104.6 – 110.8	104.0 – 110.2	0.93	1859 – 1961	107 – 113	161 – 226	6.0 – 6.3	60.4 – 63.2
37	92.6 – 97.4	111.1 – 117.6	110.4 – 116.9	0.98	1860 – 1962	107 – 113	161 – 226	6.4 – 6.8	60.5 – 63.4
38	92.4 – 97.3	117.5 – 124.4	116.8 – 123.7	1.04	1860 – 1964	107 – 113	161 – 226	6.8 – 7.2	60.7 – 63.6
39	92.2 – 97.1	124.0 – 131.2	123.2 – 130.4	1.10	1860 – 1965	107 – 113	160 – 226	7.2 – 7.6	60.8 – 63.7
40	92.1 – 97.0	130.5 – 138.0	129.6 – 137.1	1.16	1861 – 1966	107 – 113	160 – 226	7.6 – 8.0	60.9 – 63.9
41	92.0 – 96.9	136.9 – 144.8	135.9 – 143.8	1.22	1861 – 1967	107 – 113	160 – 225	8.0 – 8.4	61.0 – 64.0
42	91.8 – 96.8	143.3 – 151.6	142.3 – 150.5	1.28	1861 – 1968	107 – 113	160 – 225	8.4 – 8.9	61.1 – 64.1
43	91.7 – 96.8	149.7 – 158.4	148.6 – 157.2	1.35	1862 – 1970	107 – 113	160 – 225	8.8 – 9.3	61.2 – 64.2
44	91.6 – 96.7	156.1 – 165.1	154.9 – 163.9	1.42	1862 – 1971	107 – 113	160 – 226	9.2 – 9.7	61.3 – 64.3
45	91.4 – 96.6	162.5 – 171.9	161.2 – 170.5	1.48	1862 – 1972	107 – 113	160 – 226	9.6 – 10.1	61.4 – 64.4
46	91.2 – 96.4	168.9 – 178.6	167.5 – 177.2	1.56	1863 – 1973	107 – 113	160 – 226	10.0 – 10.5	61.6 – 64.5
47	91.1 – 96.2	175.3 – 185.4	173.8 – 183.8	1.63	1863 – 1974	107 – 113	160 – 226	10.4 – 11.0	61.6 – 64.6
48	90.9 – 96.1	181.7 – 192.1	180.1 – 190.4	1.70	1864 – 1976	107 – 113	160 – 226	10.8 – 11.4	61.7 – 64.7
49	90.7 – 95.9	188.0 – 198.8	186.3 – 197.0	1.78	1864 – 1977	107 – 113	160 – 226	11.2 – 11.8	61.8 – 64.8
50	90.5 – 95.7	194.3 – 205.5	192.5 – 203.6	1.86	1864 – 1978	107 – 113	160 – 227	11.6 – 12.2	61.9 – 64.9
51	90.3 – 95.6	200.7 – 212.2	198.7 – 210.1	1.94	1865 – 1979	107 – 113	160 – 227	12.0 – 12.6	61.9 – 64.9
52	90.1 – 95.4	207.0 – 218.9	204.9 – 216.7	2.03	1865 – 1980	107 – 113	160 – 227	12.3 – 13.1	62.0 – 65.0
53	89.9 – 95.2	213.3 – 225.5	211.0 – 223.2	2.11	1865 – 1982	107 – 113	160 – 227	12.7 – 13.5	62.0 – 65.0
54	89.7 – 95.1	219.5 – 232.2	217.2 – 229.7	2.19	1866 – 1983	107 – 113	160 – 227	13.1 – 13.9	62.1 – 65.1
55	89.4 – 94.9	225.8 – 238.8	223.3 – 236.2	2.28	1866 – 1984	107 – 113	160 – 227	13.5 – 14.3	62.1 – 65.1
56	89.2 – 94.7	232.0 – 245.5	229.4 – 242.7	2.37	1866 – 1985	107 – 113	160 – 227	13.9 – 14.7	62.2 – 65.2
57	89.0 – 94.5	238.3 – 252.1	235.5 – 249.1	2.47	1867 – 1987	107 – 113	160 – 227	14.3 – 15.1	62.2 – 65.2
58	88.7 – 94.3	244.5 – 258.7	241.5 – 255.5	2.56	1867 – 1988	107 – 113	160 – 227	14.7 – 15.5	62.3 – 65.3

Production Period Performance Table (cont.)

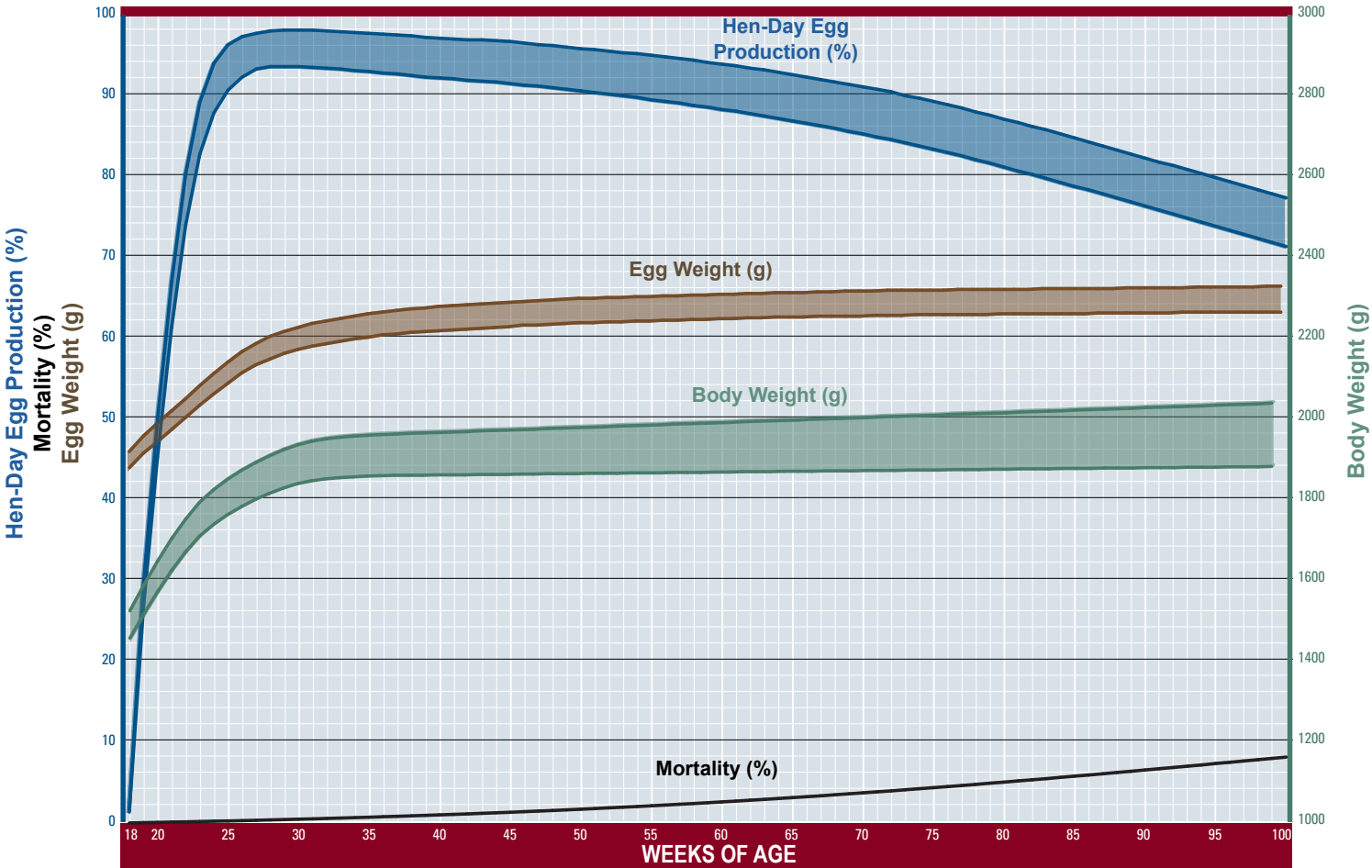
AGE (weeks)	% HEN-DAY Current	HEN-DAY EGGS Cumulative	HEN- HOUSED EGGS Cumulative	MORT- ALITY Cumulative (%)	BODY WEIGHT (g)	FEED INTAKE (g / bird / day)	WATER CONSUMP- TION (ml / bird / day)	HEN- HOUSED EGG MASS Cumulative (kg)	AVG. EGG WEIGHT (g / egg)
59	88.5 – 94.0	250.7 – 265.3	247.5 – 261.9	2.66	1867 – 1989	107 – 113	160 – 227	15.1 – 15.9	62.3 – 65.3
60	88.2 – 93.8	256.9 – 271.8	253.5 – 268.3	2.76	1868 – 1990	107 – 113	160 – 227	15.5 – 16.3	62.4 – 65.4
61	88.0 – 93.6	263.0 – 278.4	259.5 – 274.7	2.86	1868 – 1991	106 – 114	160 – 227	15.8 – 16.8	62.4 – 65.4
62	87.7 – 93.3	269.1 – 284.9	265.5 – 281.0	2.97	1869 – 1993	106 – 114	160 – 227	16.2 – 17.2	62.5 – 65.5
63	87.4 – 93.1	275.3 – 291.4	271.4 – 287.3	3.07	1869 – 1994	106 – 114	160 – 227	16.6 – 17.6	62.5 – 65.5
64	87.1 – 92.8	281.4 – 297.9	277.3 – 293.6	3.18	1869 – 1995	106 – 114	160 – 227	17.0 – 18.0	62.6 – 65.6
65	86.8 – 92.5	287.4 – 304.4	283.2 – 299.9	3.29	1870 – 1996	106 – 114	160 – 227	17.4 – 18.4	62.6 – 65.6
66	86.5 – 92.2	293.5 – 310.9	289.0 – 306.1	3.40	1870 – 1997	106 – 114	160 – 227	17.7 – 18.8	62.6 – 65.6
67	86.2 – 91.9	299.5 – 317.3	294.9 – 312.3	3.51	1870 – 1999	106 – 114	160 – 227	18.1 – 19.2	62.7 – 65.7
68	85.9 – 91.6	305.5 – 323.7	300.7 – 318.5	3.64	1871 – 2000	106 – 114	159 – 227	18.5 – 19.6	62.7 – 65.7
69	85.5 – 91.3	311.5 – 330.1	306.4 – 324.7	3.76	1871 – 2001	106 – 114	159 – 227	18.8 – 20.0	62.7 – 65.8
70	85.2 – 91.0	317.5 – 336.5	312.1 – 330.8	3.88	1871 – 2002	106 – 114	159 – 227	19.2 – 20.4	62.7 – 65.8
71	84.8 – 90.7	323.4 – 342.8	317.9 – 336.9	4.00	1872 – 2003	106 – 114	159 – 227	19.6 – 20.8	62.8 – 65.8
72	84.5 – 90.4	329.3 – 349.1	323.5 – 343.0	4.12	1872 – 2005	106 – 114	159 – 228	20.0 – 21.1	62.8 – 65.9
73	84.1 – 89.9	335.2 – 355.4	329.2 – 349.0	4.26	1872 – 2006	106 – 114	159 – 228	20.3 – 21.5	62.8 – 65.9
74	83.7 – 89.6	341.1 – 361.7	334.8 – 355.0	4.39	1873 – 2007	106 – 114	159 – 228	20.7 – 21.9	62.9 – 65.9
75	83.3 – 89.2	346.9 – 368.0	340.3 – 361.0	4.52	1873 – 2008	106 – 114	159 – 228	21.0 – 22.3	62.9 – 65.9
76	82.9 – 88.8	352.7 – 374.2	345.9 – 366.9	4.65	1873 – 2009	106 – 114	159 – 228	21.4 – 22.7	62.9 – 65.9
77	82.5 – 88.4	358.5 – 380.4	351.4 – 372.8	4.78	1874 – 2011	106 – 114	159 – 228	21.7 – 23.1	62.9 – 66.0
78	82.0 – 87.9	364.2 – 386.5	356.8 – 378.6	4.92	1874 – 2012	106 – 114	159 – 228	22.1 – 23.4	62.9 – 66.0
79	81.6 – 87.5	369.9 – 392.6	362.2 – 384.4	5.07	1874 – 2013	106 – 114	159 – 228	22.5 – 23.8	62.9 – 66.0
80	81.1 – 87.0	375.6 – 398.7	367.6 – 390.2	5.20	1875 – 2014	106 – 114	159 – 228	22.8 – 24.2	63.0 – 66.0
81	80.6 – 86.6	381.3 – 404.8	373.0 – 396.0	5.35	1875 – 2015	106 – 114	159 – 228	23.1 – 24.6	63.0 – 66.0
82	80.2 – 86.1	386.9 – 410.8	378.3 – 401.7	5.49	1876 – 2017	106 – 114	159 – 228	23.5 – 24.9	63.0 – 66.0
83	79.7 – 85.7	392.5 – 416.8	383.5 – 407.3	5.63	1876 – 2018	106 – 114	159 – 228	23.8 – 25.3	63.0 – 66.1
84	79.2 – 85.2	398.0 – 422.8	388.8 – 412.9	5.79	1876 – 2019	106 – 114	159 – 228	24.2 – 25.7	63.0 – 66.1
85	78.7 – 84.7	403.5 – 428.7	393.9 – 418.5	5.94	1877 – 2020	106 – 114	159 – 228	24.5 – 26.0	63.0 – 66.1
86	78.3 – 84.2	409.0 – 434.6	399.1 – 424.0	6.08	1877 – 2022	106 – 114	159 – 228	24.8 – 26.4	63.0 – 66.1
87	77.8 – 83.7	414.4 – 440.5	404.2 – 429.5	6.23	1877 – 2023	106 – 114	159 – 228	25.2 – 26.7	63.1 – 66.1
88	77.3 – 83.2	419.9 – 446.3	409.3 – 435.0	6.39	1878 – 2024	106 – 114	159 – 228	25.5 – 27.1	63.1 – 66.1
89	76.8 – 82.7	425.2 – 452.1	414.3 – 440.4	6.54	1878 – 2025	106 – 114	159 – 228	25.8 – 27.4	63.1 – 66.2
90	76.3 – 82.2	430.6 – 457.8	419.3 – 445.8	6.70	1878 – 2026	106 – 114	159 – 228	26.1 – 27.8	63.1 – 66.2
91	75.8 – 81.7	435.9 – 463.6	424.2 – 451.1	6.86	1879 – 2028	106 – 114	159 – 228	26.5 – 28.1	63.1 – 66.2
92	75.3 – 81.3	441.1 – 469.3	429.1 – 456.4	7.01	1879 – 2029	106 – 114	159 – 228	26.8 – 28.5	63.1 – 66.2
93	74.8 – 80.8	446.4 – 474.9	434.0 – 461.6	7.17	1879 – 2030	106 – 114	159 – 228	27.1 – 28.8	63.2 – 66.2
94	74.3 – 80.3	451.6 – 480.5	438.8 – 466.9	7.32	1880 – 2031	106 – 114	159 – 229	27.4 – 29.2	63.2 – 66.3
95	73.8 – 79.8	456.7 – 486.1	443.6 – 472.0	7.50	1880 – 2032	106 – 114	159 – 229	27.7 – 29.5	63.2 – 66.3
96	73.3 – 79.3	461.9 – 491.7	448.3 – 477.1	7.65	1880 – 2034	106 – 114	159 – 229	28.0 – 29.8	63.2 – 66.3
97	72.8 – 78.8	467.0 – 497.2	453.0 – 482.2	7.81	1881 – 2035	106 – 114	159 – 229	28.3 – 30.2	63.2 – 66.3
98	72.3 – 78.3	472.0 – 502.7	457.7 – 487.3	7.97	1881 – 2036	106 – 114	158 – 229	28.6 – 30.5	63.2 – 66.3
99	71.8 – 77.8	477.1 – 508.1	462.3 – 492.3	8.13	1881 – 2037	106 – 114	158 – 229	28.9 – 30.8	63.2 – 66.4
100	71.3 – 77.3	482.1 – 513.5	466.9 – 497.2	8.29	1882 – 2039	106 – 114	158 – 229	29.2 – 31.1	63.2 – 66.4

Production Period Space Recommendations

check local regulations concerning space requirements)

WEEKS OF AGE															
4				15				20		30	40	50	60	70	80
CONVENTIONAL AND COLONY CAGES															
Floor Space															
100–200 cm ² (50–100 birds / m ²)				360 cm ² (28 birds / m ²)				490 cm ² (20 birds / m ²)							
Nipple/Cup															
1 / 12 birds				1 / 8 birds				1 / 12 birds or access to 2 drinkers							
Feeders															
4.5 cm / bird				5–7 cm / bird				7–9 cm / bird							

Performance Graph



Egg Quality and Egg Size Distribution

Egg Quality

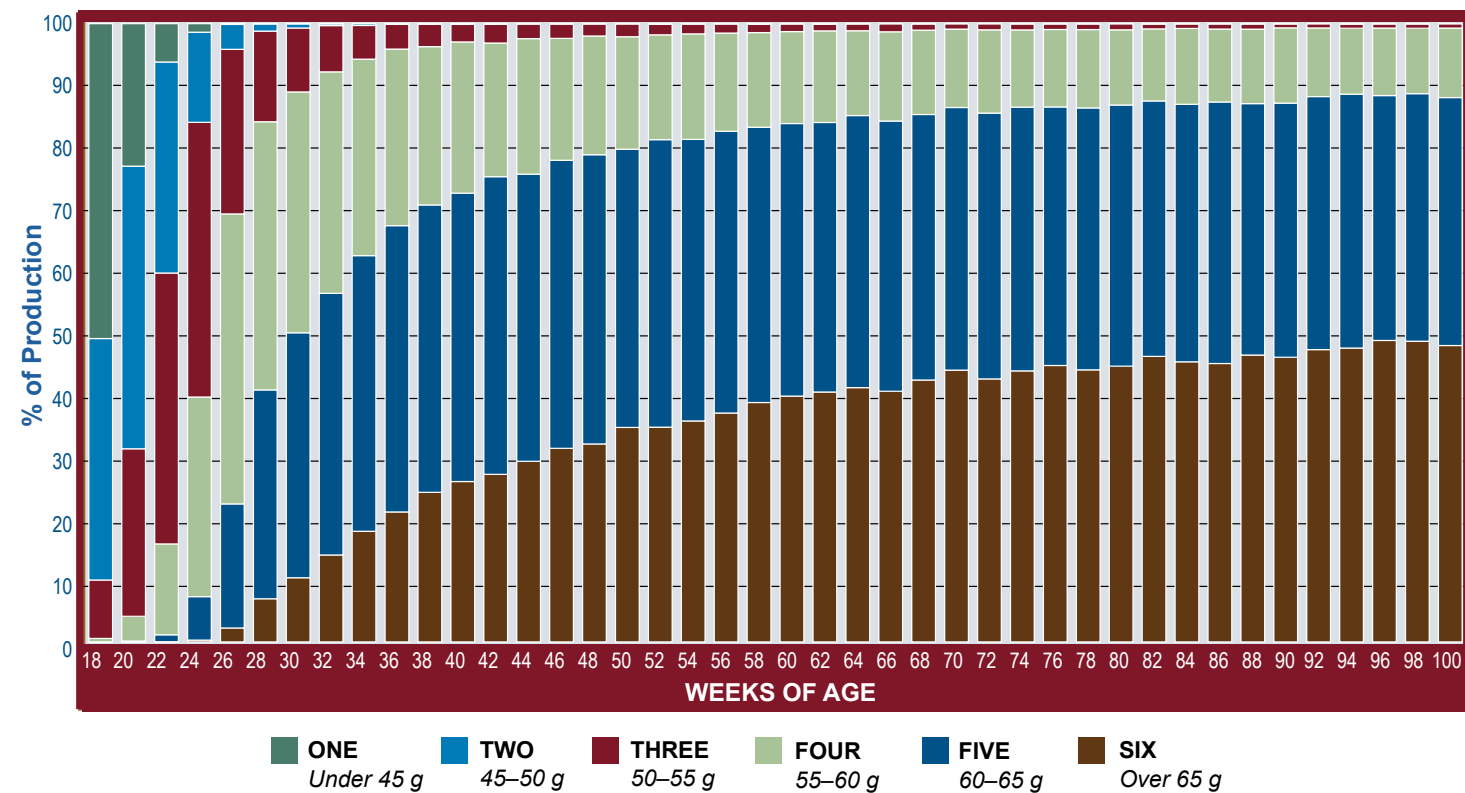
AGE (weeks)	HAUGH UNITS	BREAKING STRENGTH	SHELL COLOR
20	98.1	4440	50
22	97.5	4450	50
24	97.1	4460	49
26	96.7	4440	49
28	96.3	4420	48
30	95.9	4400	48
32	95.2	4380	48
34	94.5	4360	47
36	93.7	4340	47
38	93.0	4320	46
40	92.2	4300	46
42	91.5	4280	46
44	90.7	4260	45
46	90.0	4240	45
48	89.4	4220	44
50	88.7	4200	44
52	88.1	4180	44
54	87.4	4160	44
56	86.9	4140	43
58	86.3	4120	43
60	85.7	4100	43
62	85.2	4080	42
64	84.7	4060	42
66	84.1	4040	42
68	83.5	4020	41
70	83.0	4000	41
72	82.6	3980	41
74	82.1	3960	40
76	81.7	3940	40
78	81.2	3920	40
80	80.8	3900	40
82	80.4	3880	39
84	80.0	3860	39
86	79.6	3840	38
88	79.2	3820	38
90	78.8	3800	38

Egg Size Distribution—Chinese Standards

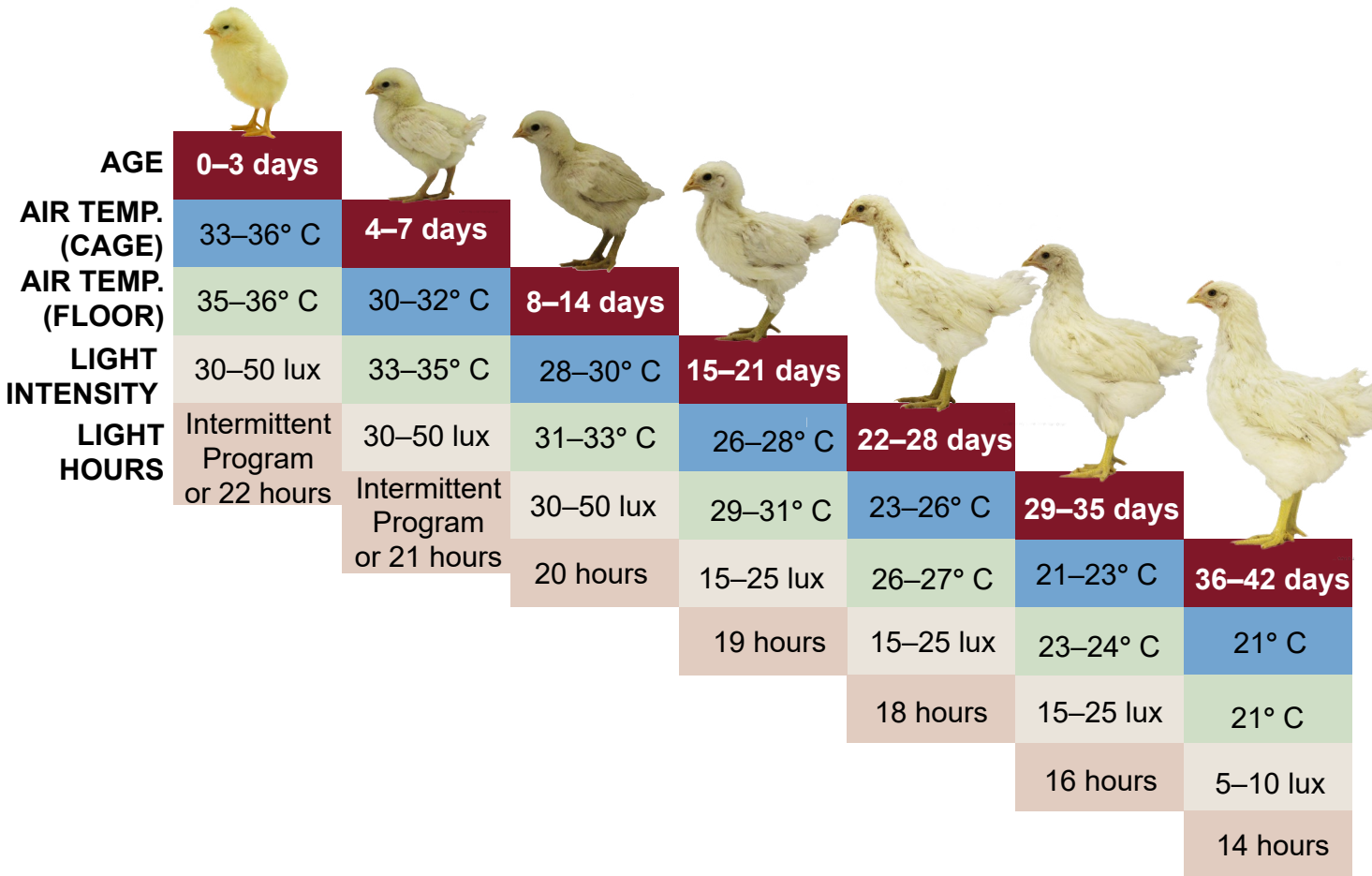
AGE (weeks)	AVERAGE EGG WEIGHT (g)	% ONE Under 45 g	% TWO 45–50 g	% THREE 50–55 g	% FOUR 55–60 g	% FIVE 60–65 g	% SIX Over 65 g
18	45.0	50.93	39.06	9.45	0.55	0.01	0.00
20	48.3	23.05	45.71	27.10	4.00	0.14	0.00
22	51.4	6.20	34.13	43.82	14.70	1.12	0.03
24	54.4	1.38	14.58	44.43	32.29	7.03	0.29
26	57.0	0.12	4.03	26.62	46.91	20.07	2.25
28	58.8	0.02	1.18	14.66	43.38	33.78	6.98
30	60.0	0.01	0.69	10.34	38.96	39.62	10.38
32	60.7	0.01	0.30	7.48	35.83	42.32	14.06
34	61.3	0.00	0.29	5.45	31.78	44.59	17.89
36	61.8	0.00	0.11	4.00	28.56	46.31	21.02
38	62.1	0.00	0.06	3.65	25.61	46.49	24.19
40	62.4	0.09	0.00	2.86	24.47	46.64	25.94
42	62.6	0.00	0.06	3.07	21.62	48.15	27.10
44	62.8	0.00	0.03	2.39	21.92	46.45	29.21
46	63.0	0.00	0.03	2.35	19.72	46.59	31.31
48	63.2	0.00	0.02	1.97	19.21	46.78	32.02
50	63.4	0.00	0.01	2.10	18.20	45.00	34.69
52	63.5	0.00	0.06	1.74	16.96	46.51	34.73
54	63.6	0.00	0.03	1.62	17.07	45.54	35.74
56	63.7	0.00	0.02	1.50	15.89	45.57	37.02
58	63.8	0.00	0.05	1.39	15.31	44.53	38.72
60	63.9	0.00	0.01	1.27	14.87	44.09	39.76
62	64.0	0.00	0.05	1.11	14.82	43.60	40.42
64	64.1	0.00	0.01	1.13	13.72	44.01	41.13
66	64.1	0.00	0.00	1.31	14.44	43.71	40.54
68	64.2	0.00	0.01	1.04	13.64	42.95	42.36
70	64.3	0.00	0.00	0.88	12.68	42.48	43.96
72	64.3	0.00	0.00	0.99	13.48	42.99	42.54
74	64.4	0.00	0.01	0.99	12.50	42.66	43.84
76	64.4	0.00	0.01	0.93	12.53	41.82	44.71
78	64.4	0.00	0.01	0.94	12.68	42.36	44.01
80	64.5	0.00	0.00	0.99	12.17	42.24	44.60
82	64.5	0.00	0.03	0.81	11.66	41.32	46.18
84	64.5	0.00	0.01	0.76	12.27	41.65	45.31
86	64.6	0.00	0.01	0.86	11.80	42.30	45.03
88	64.6	0.00	0.02	0.87	12.04	40.67	46.40
90	64.6	0.00	0.01	0.66	12.18	41.11	46.04
92	64.7	0.00	0.00	0.69	11.10	40.93	47.28
94	64.7	0.00	0.04	0.70	10.66	41.07	47.53
96	64.8	0.00	0.01	0.70	10.92	39.61	48.76
98	64.8	0.00	0.02	0.72	10.58	40.05	48.63
100	64.8	0.00	0.00	0.71	11.24	40.11	47.94

Egg Size Distribution (cont.)

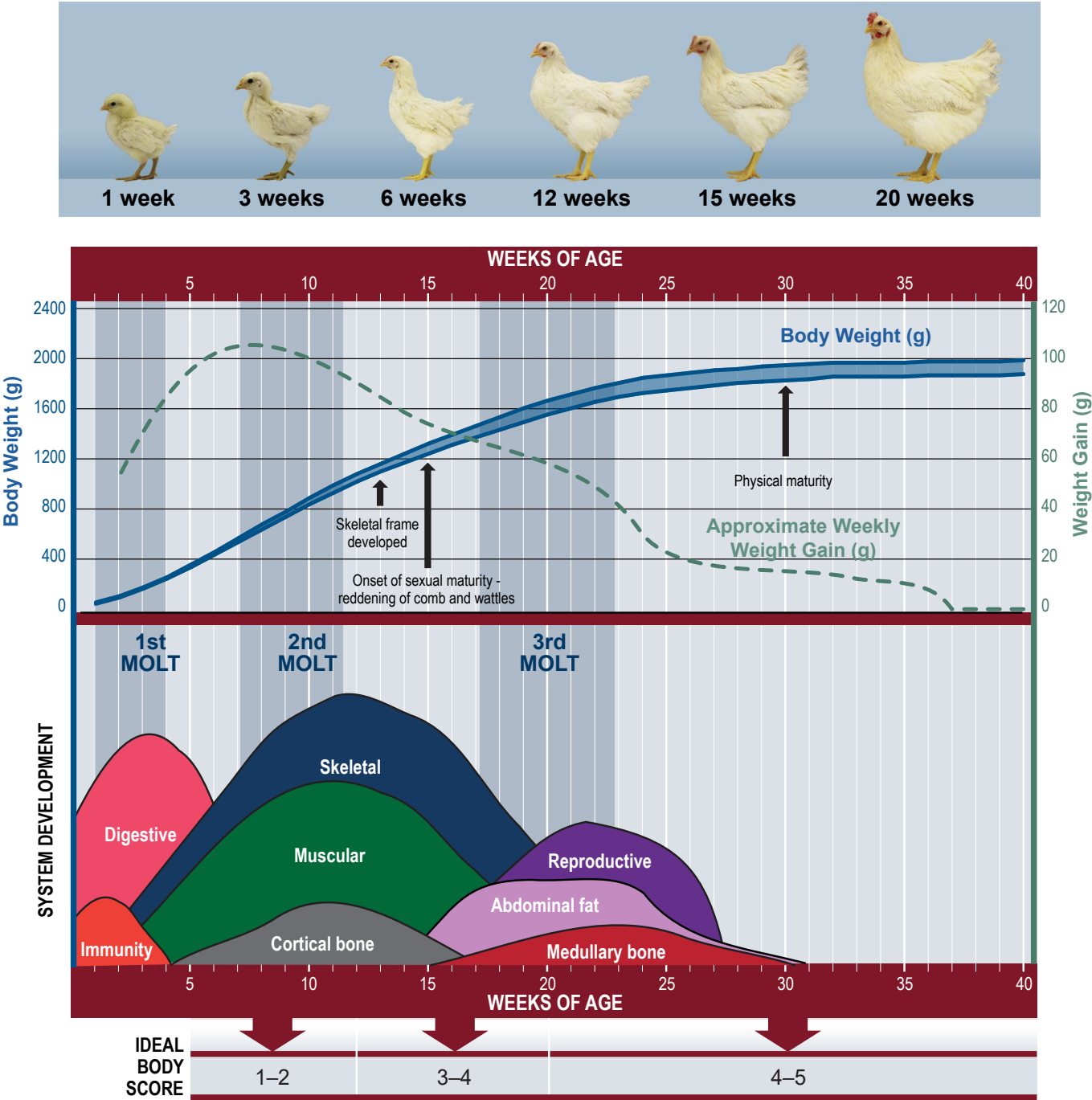
Chinese Standards



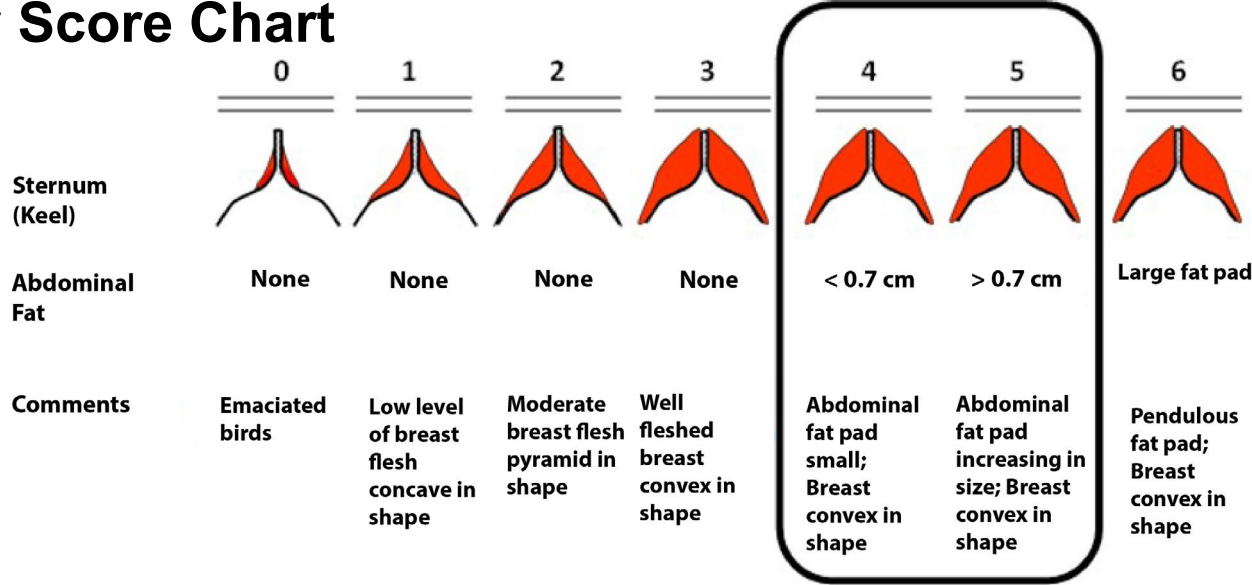
Brooding Temperature and Lighting Recommendations



Development of the Organ Systems in Pullets

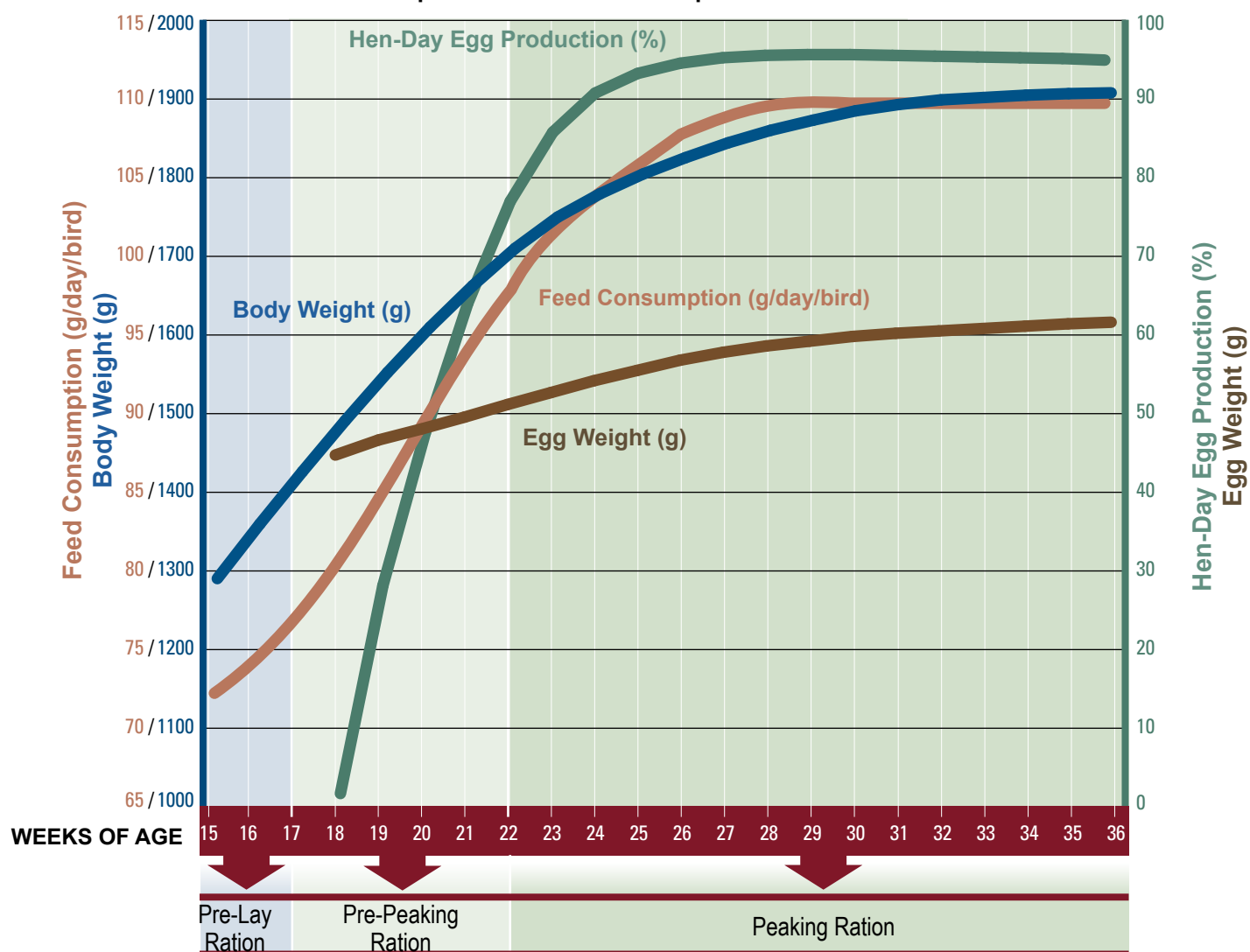


Body Score Chart



Transition Period from Rear to Peak Egg Production

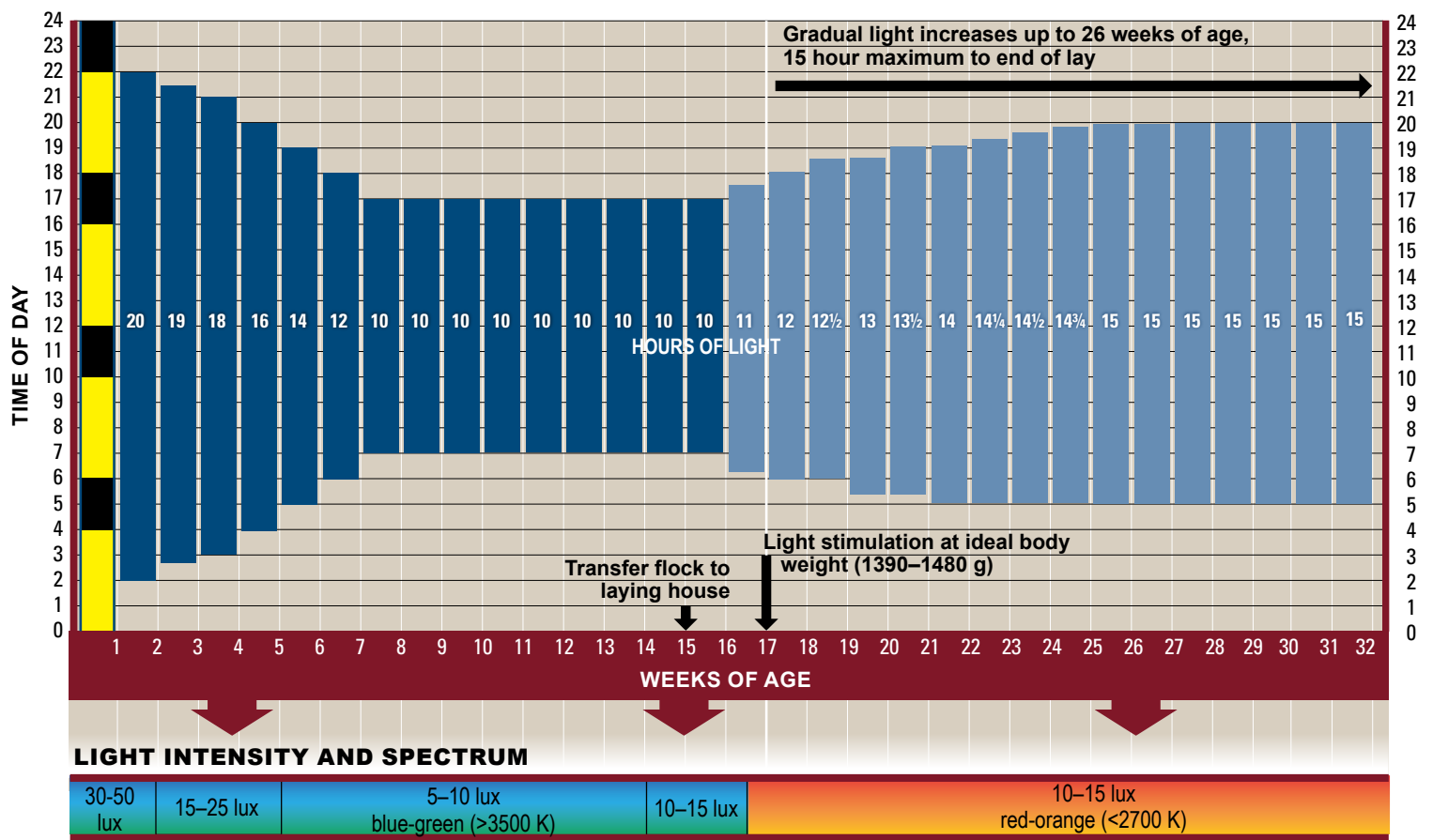
Frequently formulate to changing feed consumption during transition period until feed consumption is consistent.



Pre-Peak

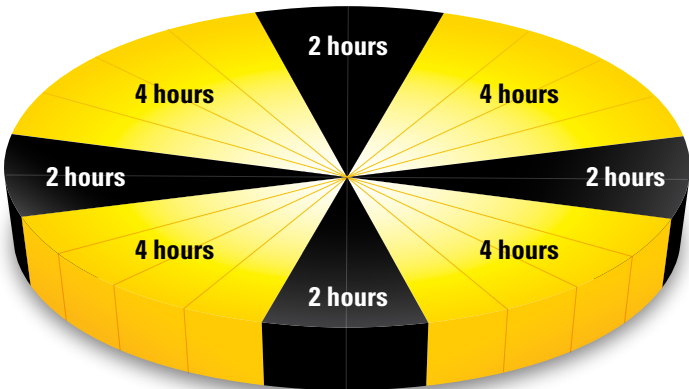
- Pre-Peak diets are intended for flocks with low feed intake and are fed for a limited period from first egg to the beginning of peak production. The nutrient specification of the Pre-Peak diet should be dense enough to allow for lower feed intake and also cater to the increased nutritional needs of the bird entering egg production. Continue to feed the Pre-Peak until feed intake has developed sufficiently to allow transition to the Peak diet.
- If utilized until no more than 50–70% HD, a Pre-Peak diet with reduced energy concentration can be beneficial to stimulate feed intake. Pre-Peaking diets are useful in situations where local conditions may result in reduced feed intake, such as hot climates where feed intake may be depressed.
- Increasing the vitamins and trace mineral inclusion to 30% can be useful to cope with the lower feed intake during the Pre-Peak phase.

Light Program for Light-Controlled Housing

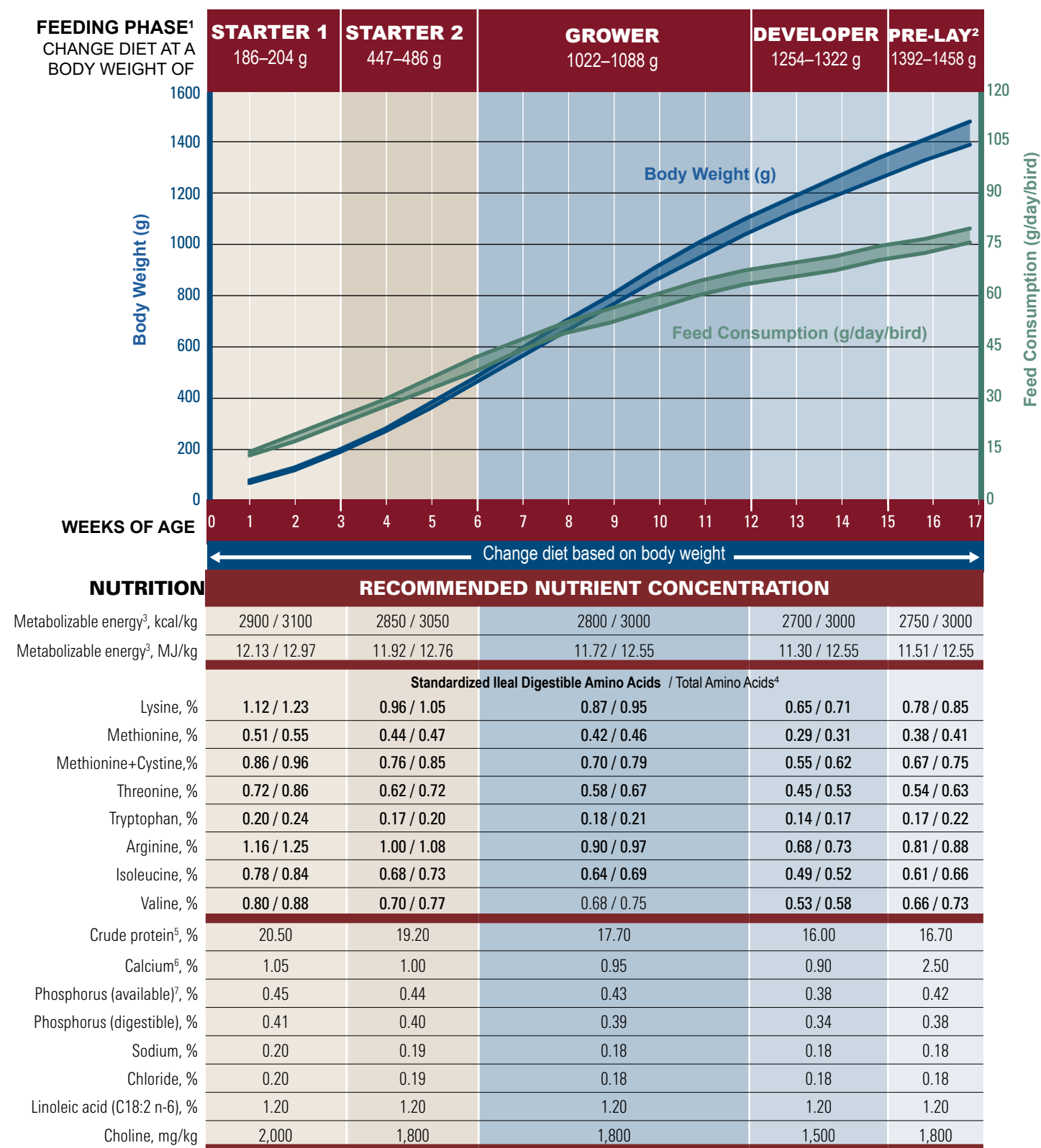


Intermittent Lighting Program for Chicks

- Preferred lighting technique.
- Use from 0–7 days (can be used up to 14 days of age).
- Intermittent dark periods provide rest periods for chicks.
- Synchronises chicks’ activities and feedings.
- Establishes more natural behaviour of rest and activity.
- May improve 7-day livability and pullet body weight.
- Some dark periods may be shortened or removed to accommodate work schedules.



Rearing Period Nutritional Recommendations



¹ Body weights are approximate. Ages shown are a guide only. Please note that at time of transfer, there will be some loss in body weight (normally 10–12%) due to reduced water intake.

² Do not feed Pre-Lay Diet earlier than 15 weeks of age. Do not feed Pre-Lay later than first egg as it contains insufficient calcium to support egg production.

³ Recommended energy range is based on raw material energy values shown in feed ingredient table at back of this guide. It is important that target concentrations of dietary energy are adjusted according to energy system applied to raw material matrix.

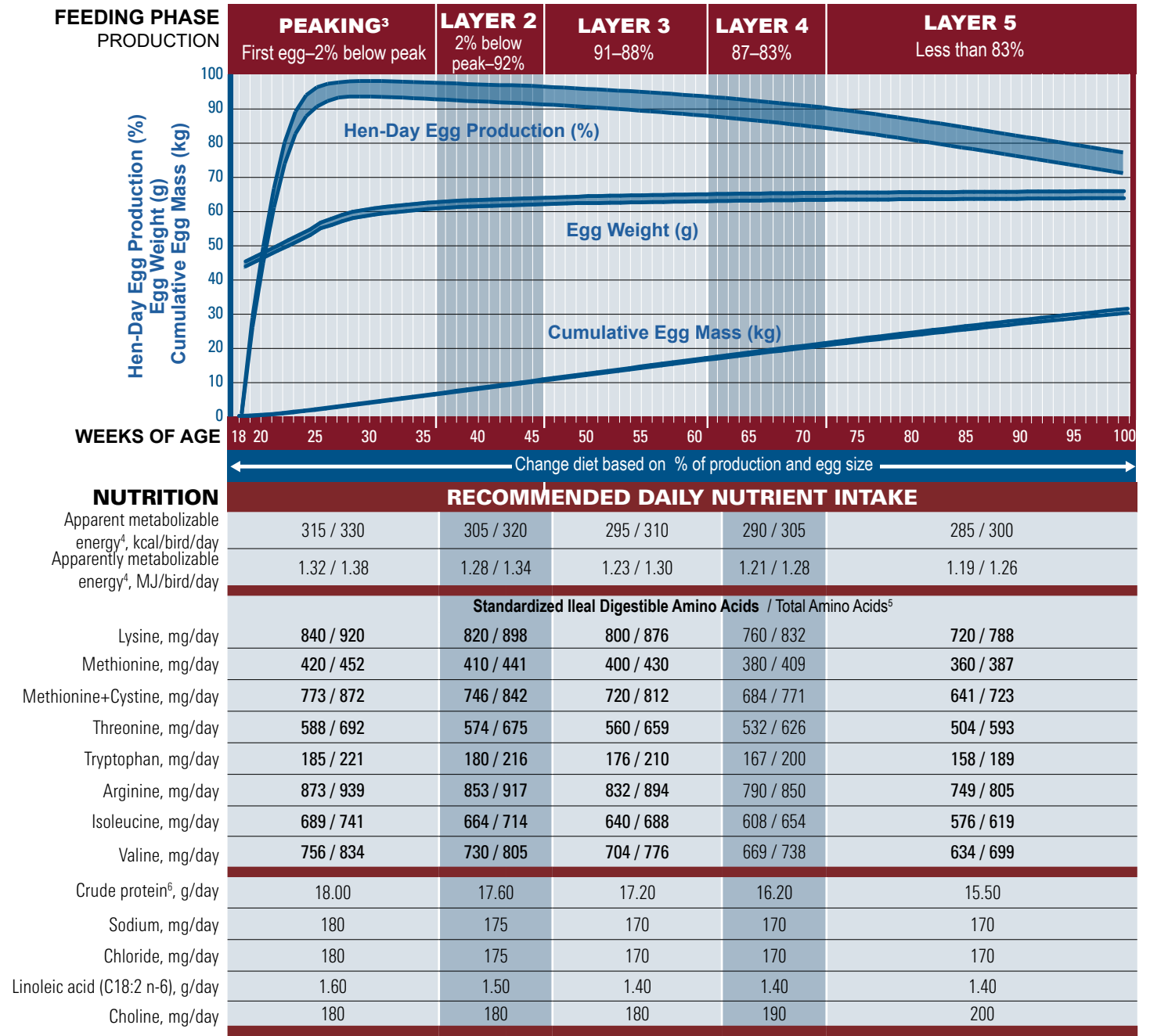
⁴ Recommendation for Total Amino Acids is only appropriate to corn and soybean meal diet. Where diets utilise other ingredients, recommendations for Standardised Ileal Digestible Amino Acids must be followed.

⁵ Diets should always be formulated to provide required intake of amino acid. Concentration of crude protein in diet will vary with raw material used. Crude protein value provided is an estimated typical value only.

⁶ Calcium should be supplied as fine calcium carbonate (mean particle size less than 2 mm). Coarse limestone (2–4 mm) can be introduced in Pre-Lay Diet at up to 50% of total limestone.

⁷ Where other phosphorus systems are used, diets should contain recommended minimum level of available phosphorus.

Production Period Nutritional Recommendations^{1,2}



	CALCIUM AND PHOSPHORUS			
	Calcium ^{7,8} g/day	Phosphorus (available) ^{7,9} mg/day	Phosphorus (digestible) mg/day	Calcium Particle Size (fine : coarse)
Weeks 18–33	4.00	432	389	40% : 60%
Weeks 34–48	4.20	405	366	35% : 65%
Weeks 49–62	4.40	373	337	30% : 70%
Weeks 63–76	4.60	347	314	25% : 75%
Weeks 77+	4.70	324	291	25% : 75%

	IDEAL PROTEIN REFERENCE				
	PEAKING	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Lysine	100%	100%	100%	100%	100%
Methionine	50%	50%	50%	50%	50%
M+C	90%	90%	90%	90%	89%
Threonine	70%	70%	70%	70%	70%
Tryptophan	22%	22%	22%	22%	22%
Arginine	104%	104%	104%	104%	104%
Isoleucine	80%	80%	80%	80%	80%
Valine	88%	88%	88%	88%	88%

Production Period Dietary Nutrient Concentrations^{1,2}

FEEDING PHASE PRODUCTION NUTRITION	PEAKING ³ First egg until production drops 2% below peak						LAYER 2 2% below peak to 92%						LAYER 3 91–88%						LAYER 4 87–83%						LAYER 5 Less than 83%					
	RECOMMENDED CONCENTRATION																													
	315 / 330						305 / 320						295 / 310						290 / 305						285 / 300					
Apparent metabolizable energy ⁴ , kcal/bird/day	1.32 / 1.38						1.28 / 1.34						1.23 / 1.30						1.21 / 1.28						1.19 / 1.26					
Apparent metabolizable energy ⁴ , MJ/bird/day																														
	FEED CONSUMPTION (*Typical Feed Consumption)																													
g/day per bird	90	95	100	105	110	100	105	110	115	120	100	105	110	115	120	100	105	110	115	120	100	105	110	115	120					
	Standardized Ileal Digestible Amino Acids																													
Lysine, %	0.93	0.88	0.84	0.80	0.76	0.82	0.78	0.75	0.71	0.68	0.80	0.76	0.73	0.70	0.67	0.76	0.72	0.69	0.66	0.63	0.72	0.69	0.65	0.63	0.60					
Methionine, %	0.47	0.44	0.42	0.40	0.38	0.41	0.39	0.37	0.36	0.34	0.40	0.38	0.36	0.35	0.33	0.38	0.36	0.35	0.33	0.32	0.36	0.34	0.33	0.31	0.30					
Methionine+Cystine, %	0.86	0.81	0.77	0.74	0.70	0.75	0.71	0.68	0.65	0.62	0.72	0.69	0.65	0.63	0.60	0.68	0.65	0.62	0.59	0.57	0.64	0.61	0.58	0.56	0.53					
Threonine, %	0.65	0.62	0.59	0.56	0.53	0.57	0.55	0.52	0.50	0.48	0.56	0.53	0.51	0.49	0.47	0.53	0.51	0.48	0.46	0.44	0.50	0.48	0.46	0.44	0.42					
Tryptophan, %	0.21	0.19	0.19	0.18	0.17	0.18	0.17	0.16	0.16	0.15	0.18	0.17	0.16	0.15	0.15	0.17	0.16	0.15	0.15	0.14	0.16	0.15	0.14	0.14	0.13					
Arginine, %	0.97	0.92	0.87	0.83	0.79	0.85	0.81	0.78	0.74	0.71	0.83	0.79	0.76	0.72	0.69	0.79	0.75	0.72	0.69	0.66	0.75	0.71	0.68	0.65	0.62					
Isoleucine, %	0.77	0.73	0.69	0.66	0.63	0.66	0.63	0.60	0.58	0.55	0.64	0.61	0.58	0.56	0.53	0.61	0.58	0.55	0.53	0.51	0.58	0.55	0.52	0.50	0.48					
Valine, %	0.84	0.80	0.76	0.72	0.69	0.73	0.70	0.66	0.63	0.61	0.70	0.67	0.64	0.61	0.59	0.67	0.64	0.61	0.58	0.56	0.63	0.60	0.58	0.55	0.53					
	Total Amino Acids ⁵																													
Lysine, %	1.02	0.97	0.92	0.88	0.84	0.90	0.86	0.82	0.78	0.75	0.88	0.83	0.80	0.76	0.73	0.83	0.79	0.76	0.72	0.69	0.79	0.75	0.72	0.69	0.66					
Methionine, %	0.50	0.48	0.45	0.43	0.41	0.44	0.42	0.40	0.38	0.37	0.43	0.41	0.39	0.37	0.36	0.41	0.39	0.37	0.36	0.34	0.39	0.37	0.35	0.34	0.32					
Methionine+Cystine, %	0.97	0.92	0.87	0.83	0.79	0.84	0.80	0.77	0.73	0.70	0.81	0.77	0.74	0.71	0.68	0.77	0.73	0.70	0.67	0.64	0.72	0.69	0.66	0.63	0.60					
Threonine, %	0.77	0.73	0.69	0.66	0.63	0.68	0.64	0.61	0.59	0.56	0.66	0.63	0.60	0.57	0.55	0.63	0.60	0.57	0.54	0.52	0.59	0.56	0.54	0.52	0.49					
Tryptophan, %	0.25	0.23	0.22	0.21	0.20	0.22	0.21	0.20	0.19	0.18	0.21	0.20	0.19	0.18	0.18	0.20	0.19	0.18	0.17	0.17	0.19	0.18	0.17	0.16	0.16					
Arginine, %	1.04	0.99	0.94	0.89	0.85	0.92	0.87	0.83	0.80	0.76	0.89	0.85	0.81	0.78	0.75	0.85	0.81	0.77	0.74	0.71	0.81	0.77	0.73	0.70	0.67					
Isoleucine, %	0.82	0.78	0.74	0.71	0.67	0.71	0.68	0.65	0.62	0.60	0.69	0.66	0.63	0.60	0.57	0.65	0.62	0.59	0.57	0.55	0.62	0.59	0.56	0.54	0.52					
Valine, %	0.93	0.88	0.83	0.79	0.76	0.81	0.77	0.73	0.70	0.67	0.78	0.74	0.71	0.67	0.65	0.74	0.70	0.67	0.64	0.62	0.70	0.67	0.64	0.61	0.58					
Crude protein ⁶ , %	20.00	18.95	18.00	17.14	16.36	17.60	16.76	16.00	15.30	14.67	17.20	16.38	15.64	14.96	14.33	16.20	15.43	14.73	14.09	13.50	15.50	14.76	14.09	13.48	12.92					
Sodium, %	0.20	0.19	0.18	0.17	0.16	0.18	0.17	0.16	0.15	0.15	0.17	0.16	0.15	0.15	0.14	0.17	0.16	0.15	0.15	0.14	0.17	0.16	0.15	0.15	0.14					
Chloride, %	0.20	0.19	0.18	0.17	0.16	0.18	0.17	0.16	0.15	0.15	0.17	0.16	0.15	0.15	0.14	0.17	0.16	0.15	0.15	0.14	0.17	0.16	0.15	0.15	0.14					
Linoleic acid (C18:2 n-6), %	1.78	1.68	1.60	1.52	1.45	1.50	1.43	1.36	1.30	1.25	1.40	1.33	1.27	1.22	1.17	1.40	1.33	1.27	1.22	1.17	1.40	1.33	1.27	1.22	1.17					
Choline, mg/kg	2000	1895	1800	1714	1636	1800	1714	1636	1565	1500	1800	1714	1636	1565	1500	1900	1810	1727	1652	1583	2000	1905	1818	1739	1667					
	CALCIUM AND PHOSPHORUS CHANGES BASED ON FEED INTAKE																													
	Weeks 18–33						Weeks 34–48						Weeks 49–62						Weeks 63–76						Weeks 77+					
Feed Consumption, g/day per bird	90	95	100	105	110	115	120	100	105	110	115	120	100	105	110	115	120	100	105	110	115	120	100	105	110	115	120			
Calcium ^{7,8} , %	4.44	4.21	4.00	3.81	3.64	3.48	3.33	4.20	4.00	3.82	3.65	3.50	4.40	4.19	4.00	3.83	3.67	4.60	4.38	4.18	4.00	3.83	4.70	4.48	4.27	4.09	3.92			
Phosphorus (available) ^{7,9} , %	0.48	0.46	0.43	0.41	0.39	0.38	0.36	0.41	0.39	0.37	0.35	0.34	0.37	0.36	0.34	0.32	0.31	0.35	0.33	0.32	0.30	0.29	0.32	0.31	0.29	0.28	0.27			
Phosphorus (digestible), %	0.43	0.41	0.39	0.37	0.35	0.34	0.32	0.37	0.35	0.33	0.32	0.31	0.34	0.32	0.31	0.29	0.28	0.31	0.30	0.29	0.27	0.26	0.29	0.28	0.26	0.24				

¹ All nutrient requirements are based on the [Feed Ingredient Tables](#).² Crude protein, methionine+cystine, fat, linoleic acid, and / or energy may be changed to optimize egg size.³ Peaking nutrient levels are calculated for birds at peak egg production. Prior to achieving peak egg production, the nutrient requirements will be lower.⁴ A good approximation of the influence of temperature on energy needs is that for each 0.5°C change higher or lower than 22°C, subtract or add about 2 kcal /bird /day, respectively.⁵ Recommendation for Total Amino Acids is only appropriate to corn and soybean meal diet. Where diets utilize other ingredients, recommendations for Standardized Ileal Digestible Amino Acids must be followed.⁶ Diets should always be formulated to provide required intake of amino acid. Concentration of crude protein in diet will vary with raw material used. Crude protein value provided is an estimated typical value only.⁷ Calcium and available phosphorus requirements are determined by flock age. When production remains higher and diets are fed for longer than ages shown, it is recommended to increase to calcium and phosphorus concentrations of next feeding phase.⁸ Calcium carbonate particle size recommendation varies throughout lay. Refer to [Calcium Particle Size](#). Dietary calcium levels and fine to coarse ratio may need to be adjusted based on limestone solubility.⁹ Where other phosphorus systems are used, diets should contain recommended minimum level of available phosphorus.

Vitamins and Trace Minerals

ITEM ^{1,2,3,4}	IN 1000 KG COMPLETE DIET	
	Rearing Period	Production Period
Vitamin A, IU	10,000,000	8,000,000
Vitamin D ₃ ⁵ , IU	3,300,000	3,300,000
Vitamin E, g	30.00	25.00
Vitamin K (menadione), g	3.50	3.00
Thiamin (B ₁), g	2.20	2.50
Riboflavin (B ₂), g	6.60	5.50
Niacin (B ₃) ⁶ , g	40.00	30.00
Pantothenic acid (B ₅), g	10.00	10.00
Pyridoxine (B ₆), g	4.50	5.00
Biotin (B ₇), mg	100.00	75.00
Folic acid (B ₉), g	1.00	0.90
Cobalamine (B ₁₂), mg	23.00	23.00
Manganese ⁷ , g	100.00	100.00
Zinc ⁷ , g	85.00	80.00
Iron ⁷ , g	30.00	40.00
Copper ⁷ , g	15.00	8.00
Iodine, g	1.50	1.20
Selenium ⁷ , g	0.25	0.25

¹ Minimum recommendations for rearing and laying periods. Local regulations may limit dietary content of individual vitamins or minerals. Levels of 150-200mg/kg of Vitamin C can be beneficial during periods of stress.

² Store premixes according to supplier's recommendations and observe 'use by' dates to ensure vitamin activity is maintained. Inclusion of antioxidant may improve premix stability.

³ Vitamin and mineral recommendations vary according to activity.

⁴ Where heat treatment is applied to diet, higher levels of vitamins may be required. Consult with vitamin supplier regarding stability through individual production processes.

⁵ A proportion of Vitamin D₃ can be supplemented as 25-hydroxy D₃ according to supplier's recommendations and applicable limits.

⁶ Higher levels of Niacin are recommended in non-cage systems.

⁷ Greater bioavailability and productivity may be possible with use of chelated mineral sources.

⁸ Supplementing with up to 500 ppm of magnesium may be beneficial to support eggshell quality, particularly in aged hens or during periods of increased metabolic demand.

Drinking Water Quality for Poultry

ITEM	MAXIMUM CONCENTRATION (ppm or mg/L)*	
Nitrate NO_3^- ¹	25	Older birds will tolerate higher levels up to 20 ppm. Stressed or disease challenged birds may be more sensitive to effects of Nitrate.
Nitrate Nitrogen ($\text{NO}_3\text{-N}$) ¹	6	
Nitrite NO_2^- ¹	4	Nitrite is considerably more toxic than Nitrate, especially for young birds, where 1 ppm Nitrite may be considered toxic.
Nitrite Nitrogen ($\text{NO}_2\text{-N}$) ¹	1	
Total dissolved solids ²	1000	Levels up to 3000 ppm may not affect performance but could increase manure moisture.
Chloride (Cl^-) ¹	250	Levels as low as 14 mg may be problematic if sodium is higher than 50 ppm.
Sulphate (SO_4^{2-}) ¹	250	Higher levels may be laxative.
Iron (Fe) ¹	<0.3	Higher levels result in bad odour and taste.
Magnesium (Mg) ¹	125	Higher levels may be laxative. Levels above 50 ppm may be problematic if sulphate levels are high.
Potassium (K) ²	20	Higher levels may be acceptable depending on sodium level, alkalinity, and pH.
Sodium (Na) ^{1,2}	50	Higher concentration is acceptable but concentrations above 50 ppm should be avoided if high levels of chloride, sulphate, or potassium exist.
Manganese (Mn) ³	0.05	Higher levels may be laxative.
Arsenic (As) ²	0.5	
Fluoride (F^-) ²	2	
Aluminium (Al) ²	5	
Boron (B) ²	5	
Cadmium (Cd) ²	0.02	
Cobalt (Co) ²	1	
Copper (Cu) ¹	0.6	Higher levels result in bitter taste.
Lead (Pb) ¹	0.02	Higher levels are toxic.
Mercury (Hg) ²	0.003	Higher levels are toxic.
Zinc (Zn) ¹	1.5	Higher levels are toxic.
pH ¹	5–7	Birds may adapt to lower pH. Below pH 5 may reduce water intake and corrode metal fittings. Above pH 8 may reduce intake and reduce effectiveness of water sanitation.
Total bacteria counts ³	1000 CFU/ml	This is likely to indicate dirty water.
Total Coliform bacteria ³	50 CFU/ml	
Faecal Coliform bacteria ³	0 CFU/ml	
Oxygen Reduction Potential (ORP) ³	650–750 mEq	The ORP range at which 2–4 ppm of free chlorine will effectively sanitise water at a favourable pH range of 5–7.

* Limits may be lower as interactions exist between magnesium and sulphate; and between sodium, potassium, chloride, and sulphate.

¹ Carter & Sneed, 1996. Drinking Water Quality for Poultry, Poultry Science and Technology Guide, North Carolina State University Poultry Extension Service. Guide no. 42

² Marx and Jaikaran, 2007. Water Analysis Interpretation. Agri-Facts, Alberta Ag-Info Centre. Refer to <http://www.agric.gov.ab.ca/app84/rwqit> for online Water Analysis Tool

³ Watkins, 2008. Water: Identifying and Correcting Challenges. Avian Advice 10(3): 10–15 University of Arkansas Cooperative Extension Service, Fayetteville

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