



*Hy-Line.*

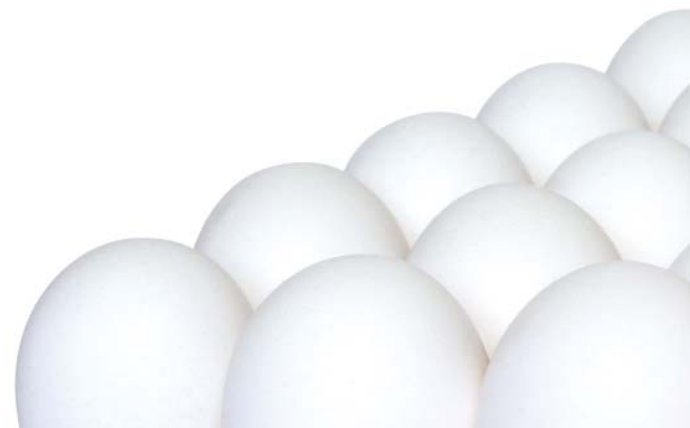
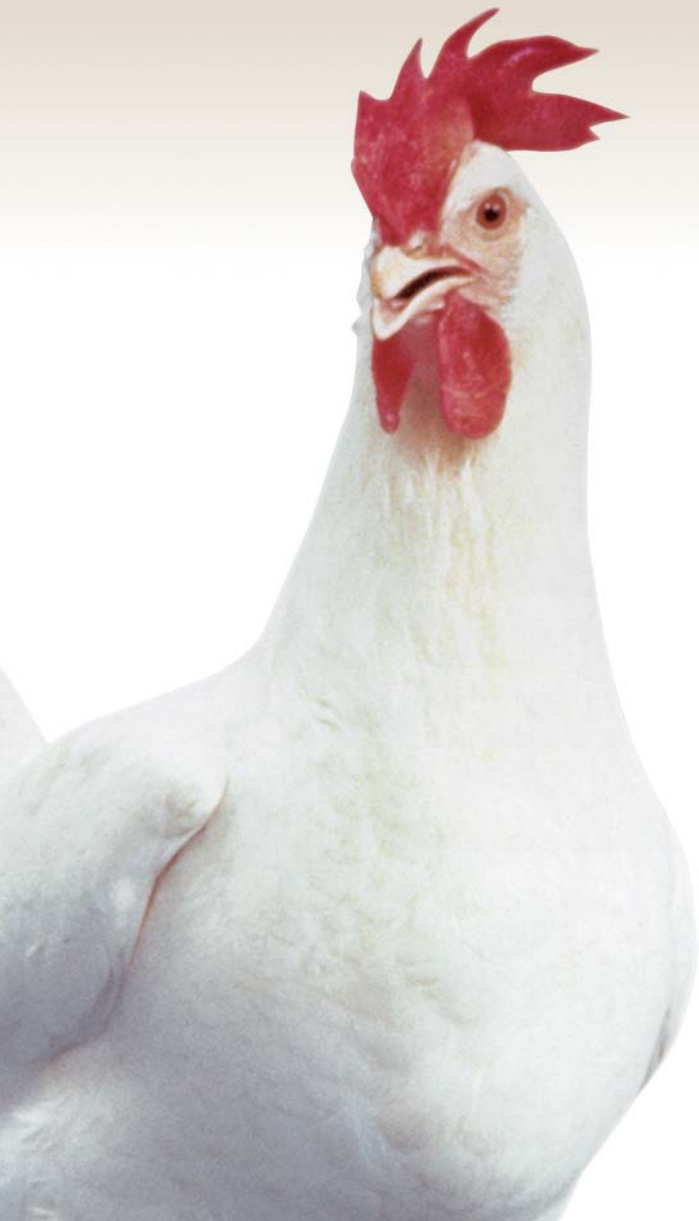
Commercial Layers

Edition 1

*Hy-Line*®

W-36

Performance Standards Manual



## **General Management Recommendations**

The genetic potential of Hy-Line varieties can only be realized if good poultry husbandry practices and management are used. This booklet outlines successful flock management programs and provides management recommendations for Hy-Line's varieties based on field experience compiled by Hy-Line, extensive commercial flock records cataloged by Hy-Line from all parts of the world and principles taken from industry technical literature.

The information and suggestions contained in this booklet should be used for guidance and educational purposes only, recognizing 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 cannot accept responsibility for any errors, omissions or inaccuracies in such information or management suggestions. Further, Hy-Line 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 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 booklet.

| Performance Summary  |   |
|--|---|
| <b>Growing Period (to 17 weeks):</b>                                   |   |
| Livability   | 97%   |
| Feed Consumed  | 5.21 kg (11.5 lb)                             |
| Body Weight at 17 Weeks  | 1.24 kg (2.7 lb)                              |
| <b>Laying Period (to 110 weeks):</b>                                   |   |
| Percent Peak   | 93–94%  |
| Hen-Day Eggs to 60 Weeks   | 240–250                                       |
| Hen-Day Eggs to 80 Weeks   | 345–361                                       |
| Hen-Day Eggs to 110 Weeks  | 472–482                                       |
| Hen-Housed Eggs to 60 Weeks  | 236–246                                       |
| Hen-Housed Eggs to 80 Weeks  | 336–352                                       |
| Hen-Housed Eggs to 110 Weeks   | 450–460                                       |
| Livability to 60 Weeks   | 96%   |
| Livability to 80 Weeks   | 94%   |
| Days to 50% Production (from hatch)                                    | 146   |
| Egg Weight at 26 Weeks   | 54.9 g/egg (43.6 lb/case)                     |
| Egg Weight at 38 Weeks   | 60.1 g/egg (47.7 lb/case)                     |
| Egg Weight at 56 Weeks   | 62.0 g/egg (49.2 lb/case)                     |
| Egg Weight at 84 Weeks   | 63.5 g/egg (50.4 lb/case)                     |
| Total Egg Mass per Hen-Day (18–80 weeks)                               | 20.8 kg (45.9 lb)                             |
| Total Egg Mass per Hen-Housed (18–80 weeks)                            | 20.2 kg (44.6 lb)                             |
| Body Weight at 32 Weeks  | 1.52 kg (3.35 lb)                             |
| Body Weight at 70 Weeks  | 1.54 kg (3.40 lb)                             |
| Shell Strength   | Excellent                                     |
| Haugh Units at 38 Weeks  | 91  |
| Haugh Units at 56 Weeks  | 88  |
| Haugh Units at 84 Weeks  | 86  |
| Percent Solids at 38 Weeks   | 24.6  |
| Percent Solids at 56 Weeks   | 24.7  |
| Percent Solids at 84 Weeks   | 24.7  |
| Average Daily Feed Consumption (18–80 weeks)                           | 91 g/day per bird (20.1 lb/day per 100 birds) |
| Feed Conversion Rate, kg Feed/kg Eggs or lb Feed/lb Eggs (21–60 weeks) | 1.82  |
| Feed Conversion Rate, kg Feed/kg Eggs or lb Feed/lb Eggs (21–80 weeks) | 1.86  |
| Feed Utilization, kg Egg/kg Feed or lb Egg/lb Feed (21–60 weeks)       | 0.55  |
| Feed Utilization, kg Egg/kg Feed or lb Egg/lb Feed (21–80 weeks)       | 0.54  |
| Feed per Dozen Eggs (21–60 weeks)                                      | 1.29 kg (2.84 lb)                             |
| Feed per Dozen Eggs (21–80 weeks)                                      | 1.35 kg (2.97 lb)                             |
| Condition of Droppings   | Dry   |

## Growing Recommendations

### Cage Growing

Chicks started in cages should be placed in the upper levels (decks), where the air is warmer and the light brighter. Intermingle seemingly weak and strong chicks (from different transport boxes) to allow the stronger chicks to 'train' the weaker chicks to find water and feed. The starter feed should be placed inside the cage on the cage paper after the chicks have had a chance to drink. Continue feeding on the paper for the first 7 to 10 days after arrival. The chicks can be distributed among all cage levels at around 14 days of age when the space has become too restricted in the upper levels.

Place paper on the cage floor during the brooding period. This will allow supplemental feeding on the cage paper to quickly get chicks eating. Place feed on the cage paper in front of the permanent feeder to train chicks to move towards the feeders. Remove the paper by 14 days of age to avoid build up of feces that could lead to enteric disease or coccidia infections.

Waterlines should be flushed prior to arrival of the chicks. Drinking water temperature should be 25 to 30°C (77 to 86°F) for the first week. Adjusting water system pressure in nipple drinkers to create a hanging drip will help chicks find water. Cup drinkers should be manually filled during the first 3 days to train chicks to drink.

### Floor Growing

Chicks started on the floor should be transferred from the transport boxes to the litter under the water lines or near drinkers to encourage drinking. To make it easier for the chicks to drink, use supplemental drinkers in addition to the automatic drinkers. The supplemental drinkers should be used for the first 10 to 14 days and can also be used for administering the first vaccination if given in the water. When used, gradually move supplemental feeders and drinkers towards the permanent feeders and drinkers in the room to train the chicks to find the permanent feeders and waterers.

Birds should be grown in housing that allows adjustment to the lighting program and the light intensity. The lighting programs are usually similar to those used for birds in cage production, but light intensity may be different. It is important to provide floor-grown birds with enough light intensity to allow them to navigate their environment. A light intensity of 20 to 30 lux (2 to 3 foot-candles) should be used during the first week of age, dropping down to 15 lux (1.5 foot-candles) by week 4 and remaining at the level until week 15 of age. At week 15 of age, gradually increase the light intensity, reaching 20 to 30 lux (2 to 3 foot-candles) by the time the pullets are transferred to the layer house. Birds moving into open-sided housing should have higher light intensities of 30 to 40 lux (3 to 4 foot-candles) at the time of housing.

### Growing Space Recommendations

|                                     | Cage  | Floor  |
|-------------------------------------|---|--|
| Floor                               | 310 cm <sup>2</sup> /bird<br>(48 in <sup>2</sup> /bird) | 835 cm <sup>2</sup> /bird<br>(0.9 ft <sup>2</sup> /bird)                     |
| Feeder                              | 5 cm/bird<br>(2 in/bird)                                | 5 cm/bird and 1 pan<br>per 50 birds<br>(2 in/bird and 1 pan<br>per 50 birds) |
| Drinking system,<br>trough waterer  | 2.5 cm/bird<br>(1 in/bird)                              | 2.0 cm/bird<br>(0.8 in/bird)   |
| Drinking system,<br>cups or nipples | 1 per 8 birds   | 1 per 15 birds   |
| Drinking system,<br>fountains       | —   | 1 per 150 birds  |

### Ambient Temperature and Relative Humidity

Observing the chicks will tell you whether or not the temperature is correct. If they are too cool, they will huddle near the heat source. If they are too warm, they will spread out away from the heat source. If there are drafts, they will huddle in groups to get away from the spot where the cool air enters the heated area. Comfortable chicks will spread out uniformly, without huddling, throughout the brooding area.

Look for signs of overheating (panting and drowsiness) or chilling (huddling and loud chirping) and make appropriate adjustments. Heat control is more critical in cage brooding because the chicks cannot move to find their comfort zone.

Birds are very sensitive to extremes of relative humidity. A relative humidity below 30% will cause increased agitation of the chicks and may cause aggressive behavior. Conversely, excessive moisture may cause wet litter conditions, associated with high ammonia concentrations, poor air quality, enteric diseases, and respiratory problems. Ideally, the relative humidity should be between 40 and 60%. Humidity control becomes increasingly important when warm-room brooding in cold climates. To increase the relative humidity, water can be sprayed on the walk ways or floors. Humidity will normally be lowered to 30 to 40% by the end of the growing period.

### Recommended Brooding Temperatures<sup>1</sup>

| Age (days) | Cage              | Floor             |
|------------|-------------------|-------------------|
| 1–3        | 32–33°C (90–92°F) | 33–35°C (92–95°F) |
| 4–7        | 30–32°C (86–90°F) | 31–33°C (88–92°F) |
| 8–14       | 28–30°C (82–86°F) | 29–31°C (84–88°F) |
| 15–21      | 26–28°C (78–82°F) | 27–29°C (80–84°F) |
| 22–28      | 23–26°C (74–78°F) | 24–27°C (76–80°F) |
| 29–35      | 21–23°C (70–74°F) | 22–24°C (72–76°F) |
| 36+        | 21°C (70°F)       | 21°C (70°F)       |

<sup>1</sup>Modify the temperatures as needed to meet the chicks' comfort needs.

**Growing Recommendations**

**Water Consumption for Pullets and Layers**

**Drinking Water**

Water is the most important nutrient and good-quality water must be available to the birds at all times. Only in special cases (e.g., prior to vaccine delivery through the drinking water), should drinking water be restricted, and then only for a short time and under careful monitoring.

**Monitoring drinking-water intake**

Water and feed consumption are directly related—when birds drink less water, they consume less feed, and production quickly declines accordingly. As a general rule, healthy adult birds will consume twice as much water as feed, although the ratio increases during periods of warm weather. Installation and use of water meters in each house or barn are recommended to monitor the flock’s water intake on a daily basis. Such daily water-intake records can be used as an early warning of problems in the flock.

**Water consumed per 100 birds per day**

Chicks should consume 0.83 liters (0.22 gallons) per 100 birds on day one of age.

| Age in weeks | Liters    | Gallons (U.S.) |
|--------------|-----------|----------------|
| 1            | 0.8–1.1   | 0.20–0.30      |
| 2            | 1.1–1.9   | 0.30–0.50      |
| 3            | 1.7–2.7   | 0.45–0.70      |
| 4            | 2.5–3.8   | 0.65–1.00      |
| 5            | 3.4–4.7   | 0.90–1.25      |
| 6            | 4.5–5.7   | 1.20–1.50      |
| 7            | 5.7–6.8   | 1.50–1.80      |
| 8            | 6.1–8.0   | 1.60–2.10      |
| 9            | 6.4–9.5   | 1.70–2.50      |
| 10–15        | 6.8–10.2  | 1.80–2.70      |
| 16–20        | 7.2–15.2  | 1.90–4.00      |
| 21–25*       | 9.9–18.2  | 2.60–4.80      |
| Over 25*     | 15.2–20.8 | 4.00–5.50      |

\* Higher temperatures tend to elevate water consumption by 1.9 liters (0.5 gallons) per 100 birds.

**Lighting Programs**

Egg production is very closely related to the changes in day length. Body weight gain in grow, egg numbers, egg size, livability, and total profitability can be favorably influenced by a proper lighting program.

When open-type houses are used, which allow natural daylight to affect the flock, the lighting program must be planned in conjunction with changes in the natural day length. Because no two places have the same sunrise-sunset times year-round, custom lighting programs for any location worldwide are available.

A customizable lighting program is available in multiple languages and will create a downloadable spreadsheet with sunrise and sunset times for any location in the world and the lighting program for your flock. Visit [www.hyline.com](http://www.hyline.com) to access the customizable lighting program.

**Cage Density Recommendations in Lay**

|                                     | U.S. Recommended<br>(United Egg Producers)                     |
|-------------------------------------|--|
| Floor                               | 438–555 cm <sup>2</sup> /bird<br>(68–86 in <sup>2</sup> /bird) |
| Feeder                              | 7.6 cm/bird<br>(3 in/bird)                                     |
| Drinking system,<br>trough waterer  | 2.5 cm/bird<br>(1 in/bird)                                     |
| Drinking system,<br>cups or nipples | 1 per 12 birds   |

| Target Weights   |              |      |
|------------------|--------------|------|
| —Growing Period— |              |      |
| Age in Weeks     | Body Weight* |      |
|                  | g            | lb   |
| 1                | 65           | 0.14 |
| 2                | 110          | 0.24 |
| 3                | 170          | 0.37 |
| 4                | 250          | 0.55 |
| 5                | 320          | 0.71 |
| 6                | 410          | 0.90 |
| 7                | 500          | 1.10 |
| 8                | 590          | 1.30 |
| 9                | 690          | 1.52 |
| 10               | 790          | 1.74 |
| 11               | 870          | 1.92 |
| 12               | 940          | 2.07 |
| 13               | 1020         | 2.25 |
| 14               | 1090         | 2.40 |
| 15               | 1160         | 2.56 |
| 16               | 1200         | 2.65 |
| 17**             | 1240         | 2.73 |
| 18               | 1270         | 2.80 |

\* Pullets grown on the floor, or in a tropical climate, can be 50 g (0.1 lb) lighter than shown.

\*\* Move to Lay House

| Feed Consumption* |                |                      |            |            |
|-------------------|----------------|----------------------|------------|------------|
| —Growing Period—  |                |                      |            |            |
| Age in weeks      | Daily          |                      | Cumulative |            |
|                   | g/day per bird | lb/day per 100 birds | g to date  | lb to date |
| 1                 | 13             | 2.80                 | 89         | 0.20       |
| 2                 | 16             | 3.50                 | 200        | 0.44       |
| 3                 | 19             | 4.20                 | 333        | 0.74       |
| 4                 | 29             | 6.30                 | 533        | 1.18       |
| 5                 | 38             | 8.40                 | 800        | 1.76       |
| 6                 | 41             | 8.97                 | 1085       | 2.39       |
| 7                 | 43             | 9.45                 | 1385       | 3.05       |
| 8                 | 46             | 10.10                | 1706       | 3.76       |
| 9                 | 48             | 10.60                | 2042       | 4.50       |
| 10                | 51             | 11.20                | 2398       | 5.29       |
| 11                | 53             | 11.60                | 2766       | 6.10       |
| 12                | 54             | 12.00                | 3147       | 6.94       |
| 13                | 56             | 12.30                | 3538       | 7.80       |
| 14                | 57             | 12.60                | 3938       | 8.68       |
| 15                | 59             | 13.00                | 4351       | 9.59       |
| 16                | 61             | 13.40                | 4776       | 10.53      |
| 17                | 62             | 13.70                | 5211       | 11.49      |

\* Pullet feed consumption varies with feed formulation and environmental temperatures.

| Growing Period Nutrition Recommendations                |             |             |             |             |                      |
|---|-------------|-------------|-------------|-------------|----------------------|
| Item <sup>1</sup>                                       | Starter 1   | Starter 2   | Grower      | Developer   | Pre-lay <sup>5</sup> |
| Feed to a body weight of                                | 170 g       | 410 g       | 940 g       | 1160 g      | 1240 g               |
| Approximate age   | 0–3 weeks   | 4–6 weeks   | 7–12 weeks  | 13–15 weeks | 16–17 weeks          |
| <b>Recommended concentration<sup>2</sup></b>            |             |             |             |             |                      |
| Metabolizable energy, kcal/lb                           | 1350–1400   | 1350–1400   | 1350–1400   | 1350–1420   | 1320–1340            |
| Metabolizable energy, kcal/kg                           | 2977–3087   | 2977–3087   | 2977–3087   | 2977–3131   | 2911–2955            |
| Metabolizable energy, MJ/kg                             | 12.46–12.92 | 12.46–12.92 | 12.46–12.92 | 12.46–13.11 | 12.18–12.37          |
| <b>Minimum recommended concentration</b>                |             |             |             |             |                      |
| <b>Standardized (true) ileal digestible amino acids</b> |             |             |             |             |                      |
| Lysine, %   | 1.05        | 0.98        | 0.88        | 0.76        | 0.78                 |
| Methionine, %   | 0.47        | 0.44        | 0.40        | 0.36        | 0.38                 |
| Methionine+cystine, %                                   | 0.74        | 0.74        | 0.67        | 0.59        | 0.66                 |
| Threonine, %  | 0.69        | 0.66        | 0.60        | 0.52        | 0.55                 |
| Tryptophan, %   | 0.18        | 0.18        | 0.17        | 0.15        | 0.16                 |
| Arginine, %   | 1.12        | 1.05        | 0.94        | 0.81        | 0.83                 |
| Isoleucine, %   | 0.74        | 0.71        | 0.65        | 0.57        | 0.62                 |
| Valine, %   | 0.76        | 0.73        | 0.69        | 0.61        | 0.66                 |
| <b>Total amino acids<sup>3</sup></b>                    |             |             |             |             |                      |
| Lysine, %   | 1.15        | 1.07        | 0.96        | 0.83        | 0.85                 |
| Methionine, %   | 0.51        | 0.47        | 0.44        | 0.38        | 0.41                 |
| Methionine+cystine, %                                   | 0.83        | 0.83        | 0.75        | 0.67        | 0.74                 |
| Threonine, %  | 0.82        | 0.77        | 0.70        | 0.62        | 0.64                 |
| Tryptophan, %   | 0.21        | 0.21        | 0.20        | 0.18        | 0.20                 |
| Arginine, %   | 1.21        | 1.13        | 1.01        | 0.87        | 0.90                 |
| Isoleucine, %   | 0.79        | 0.76        | 0.70        | 0.61        | 0.67                 |
| Valine, %   | 0.83        | 0.80        | 0.76        | 0.67        | 0.73                 |
| Crude protein (nitrogen × 6.25), <sup>3</sup>           | 20.00       | 19.00       | 18.00       | 17.00       | 17.00                |
| Calcium, <sup>4</sup> %                                 | 1.00        | 1.00        | 1.00        | 1.40        | 2.50                 |
| Phosphorus (available), %                               | 0.50        | 0.49        | 0.47        | 0.45        | 0.48                 |
| Sodium, %   | 0.18        | 0.18        | 0.18        | 0.18        | 0.18                 |
| Chloride, %   | 0.18        | 0.18        | 0.18        | 0.18        | 0.18                 |
| Linoleic acid (C18:2 n-6), %                            | 1.00        | 1.00        | 1.00        | 1.00        | 1.00                 |

<sup>1</sup> Change diets at the recommended target body weight—the approximate age is a guide only.

<sup>2</sup> Differences in the metabolizable energy value assigned to feed ingredients of the same name can differ substantially; in some cases, the recommended dietary energy content may have to be adjusted accordingly (see Hy-Line Online Management Guide for additional information).

<sup>3</sup> The minimum recommendations for total amino acids and crude protein are only appropriate with a corn and soybean meal diet; please formulate the diet on digestible amino acid basis instead.

<sup>4</sup> Calcium should be supplied as a fine calcium carbonate source (mean particle size less than 2 mm).

<sup>5</sup> Do not feed the pre-lay diet beyond the first egg as it does not contain sufficient calcium to sustain egg production.

| Laying Period Nutrition Recommendations                 |                             |                                    |                             |                                 |
|---|-----------------------------|------------------------------------|-----------------------------|---------------------------------|
| Item <sup>1</sup>                                       | Peaking                     | Above 92% to 87%<br>egg production | 86 to 82%<br>egg production | Less than 82%<br>egg production |
|   | Point of lay to 32<br>weeks | 33–44 weeks                        | 45–58 weeks                 | 59+ weeks                       |
| <b>Recommended concentration<sup>2</sup></b>            |                             |                                    |                             |                                 |
| Metabolizable energy, kcal/lb                           | 1290–1340                   | 1290–1335                          | 1280–1325                   | 1270–1290                       |
| Metabolizable energy, kcal/kg                           | 2844–2955                   | 2844–2944                          | 2822–2922                   | 2800–2844                       |
| Metabolizable energy, MJ/kg                             | 11.90–12.37                 | 11.90–12.32                        | 11.81–12.23                 | 11.72–11.90                     |
| <b>Minimum recommended concentration</b>                |                             |                                    |                             |                                 |
| <b>Standardized (true) ileal digestible amino acids</b> |                             |                                    |                             |                                 |
| Lysine, mg/day  | 805                         | 750                                | 710                         | 695                             |
| Methionine, mg/day                                      | 394                         | 368                                | 348                         | 334                             |
| Methionine+cystine, mg/day                              | 676                         | 630                                | 596                         | 570                             |
| Threonine, mg/day                                       | 564                         | 525                                | 497                         | 487                             |
| Tryptophan, mg/day                                      | 169                         | 158                                | 149                         | 146                             |
| Arginine, mg/day  | 861                         | 803                                | 760                         | 744                             |
| Isoleucine, mg/day                                      | 636                         | 593                                | 561                         | 549                             |
| Valine, mg/day  | 725                         | 675                                | 639                         | 626                             |
| <b>Total amino acids<sup>3</sup></b>                    |                             |                                    |                             |                                 |
| Lysine, mg/day  | 881                         | 821                                | 777                         | 761                             |
| Methionine, mg/day                                      | 424                         | 395                                | 374                         | 359                             |
| Methionine+cystine, mg/day                              | 763                         | 711                                | 673                         | 643                             |
| Threonine, mg/day                                       | 663                         | 618                                | 585                         | 572                             |
| Tryptophan, mg/day                                      | 202                         | 188                                | 178                         | 174                             |
| Arginine, mg/day  | 926                         | 863                                | 817                         | 800                             |
| Isoleucine, mg/day                                      | 684                         | 637                                | 603                         | 590                             |
| Valine, mg/day  | 799                         | 744                                | 705                         | 690                             |
| Crude protein (nitrogen × 6.25), <sup>3</sup> g/day     | 16.00                       | 15.50                              | 15.25                       | 15.00                           |
| Calcium, <sup>4</sup> g/day                             | 4.00                        | 4.20                               | 4.35                        | 4.50                            |
| Phosphorus (available), mg/day                          | 500                         | 480                                | 460                         | 400                             |
| Sodium, mg/day  | 180                         | 180                                | 180                         | 180                             |
| Chloride, mg/day  | 180                         | 180                                | 180                         | 180                             |
| Linoleic acid (C18:2 n-6), g/day                        | 1.00                        | 1.00                               | 1.00                        | 1.00                            |
| Choline, mg/day   | 100                         | 100                                | 100                         | 100                             |

<sup>1</sup> Consumption of amino acids, fat, linoleic acid, and/or energy may be changed to optimize egg size.

<sup>2</sup> The recommended energy range is based on the energy values shown in the Hy-Line Online Management Guide. Differences in the metabolizable energy value assigned to feed ingredients of the same name can differ substantially; in some cases, the recommended dietary energy content may have to be adjusted accordingly (see Hy-Line Online Management Guide for additional information).

<sup>3</sup> Total amino acids are only appropriate with a corn and soybean meal diet; please formulate the diet on digestible amino acid basis if a substantial amount of other protein-supplying ingredients are used.

<sup>4</sup> Approximately 65% of the added calcium carbonate (limestone) should be in particle sizes of 2–4 mm.



| Laying Period Nutrition Recommendations                 |                          |       |              |       |       |                                 |       |              |       |       |                           |       |              |       |       |                              |       |              |       |       |
|---|--------------------------|-------|--------------|-------|-------|---------------------------------|-------|--------------|-------|-------|---------------------------|-------|--------------|-------|-------|------------------------------|-------|--------------|-------|-------|
| Item <sup>1</sup>                                       | Peaking                  |       |              |       |       | Above 92% to 87% egg production |       |              |       |       | 86% to 82% egg production |       |              |       |       | Less than 82% egg production |       |              |       |       |
|   | Point of lay to 32 weeks |       |              |       |       | 33–44 weeks                     |       |              |       |       | 45–58 weeks               |       |              |       |       | 59+ weeks                    |       |              |       |       |
| <b>Recommended concentration<sup>2</sup></b>            |                          |       |              |       |       |                                 |       |              |       |       |                           |       |              |       |       |                              |       |              |       |       |
| Metabolizable energy, kcal/lb                           | 1290–1340                |       |              |       |       | 1290–1335                       |       |              |       |       | 1280–1325                 |       |              |       |       | 1270–1290                    |       |              |       |       |
| Metabolizable energy, kcal/kg                           | 2844–2955                |       |              |       |       | 2844–2944                       |       |              |       |       | 2822–2922                 |       |              |       |       | 2800–2844                    |       |              |       |       |
| Metabolizable energy, MJ/kg                             | 11.90–12.37              |       |              |       |       | 11.90–12.32                     |       |              |       |       | 11.81–12.23               |       |              |       |       | 11.72–11.90                  |       |              |       |       |
| <b>Feed consumption</b>                                 |                          |       |              |       |       |                                 |       |              |       |       |                           |       |              |       |       |                              |       |              |       |       |
| g/day per bird  | 74                       | 79    | <b>84*</b>   | 89    | 94    | 85                              | 90    | <b>95*</b>   | 100   | 105   | 85                        | 90    | <b>95*</b>   | 100   | 105   | 83                           | 88    | <b>93*</b>   | 98    | 103   |
| lb/day per 100 birds                                    | 16.3                     | 17.4  | <b>18.5</b>  | 19.6  | 20.7  | 18.7                            | 19.8  | <b>20.9</b>  | 22.1  | 23.2  | 18.7                      | 19.8  | <b>20.9</b>  | 22.1  | 23.2  | 18.3                         | 19.4  | <b>20.5</b>  | 21.6  | 22.7  |
| <b>Standardized (true) ileal digestible amino acids</b> |                          |       |              |       |       |                                 |       |              |       |       |                           |       |              |       |       |                              |       |              |       |       |
| Lysine, %   | 1.09                     | 1.02  | <b>0.96</b>  | 0.90  | 0.86  | 0.88                            | 0.83  | <b>0.79</b>  | 0.75  | 0.71  | 0.84                      | 0.79  | <b>0.75</b>  | 0.71  | 0.68  | 0.84                         | 0.79  | <b>0.75</b>  | 0.71  | 0.67  |
| Methionine, %   | 0.53                     | 0.50  | <b>0.47</b>  | 0.44  | 0.42  | 0.43                            | 0.41  | <b>0.39</b>  | 0.37  | 0.35  | 0.41                      | 0.39  | <b>0.37</b>  | 0.35  | 0.33  | 0.40                         | 0.38  | <b>0.36</b>  | 0.34  | 0.32  |
| Methionine+cystine, %                                   | 0.91                     | 0.86  | <b>0.80</b>  | 0.76  | 0.72  | 0.74                            | 0.70  | <b>0.66</b>  | 0.63  | 0.60  | 0.70                      | 0.66  | <b>0.63</b>  | 0.60  | 0.57  | 0.69                         | 0.65  | <b>0.61</b>  | 0.58  | 0.55  |
| Threonine, %  | 0.76                     | 0.71  | <b>0.67</b>  | 0.63  | 0.60  | 0.62                            | 0.58  | <b>0.55</b>  | 0.53  | 0.50  | 0.58                      | 0.55  | <b>0.52</b>  | 0.50  | 0.47  | 0.59                         | 0.55  | <b>0.52</b>  | 0.50  | 0.47  |
| Tryptophan, %   | 0.23                     | 0.21  | <b>0.20</b>  | 0.19  | 0.18  | 0.19                            | 0.18  | <b>0.17</b>  | 0.16  | 0.15  | 0.18                      | 0.17  | <b>0.16</b>  | 0.15  | 0.14  | 0.18                         | 0.17  | <b>0.16</b>  | 0.15  | 0.14  |
| Arginine, %   | 1.16                     | 1.09  | <b>1.03</b>  | 0.97  | 0.92  | 0.94                            | 0.89  | <b>0.85</b>  | 0.80  | 0.76  | 0.89                      | 0.84  | <b>0.80</b>  | 0.76  | 0.72  | 0.90                         | 0.85  | <b>0.80</b>  | 0.76  | 0.72  |
| Isoleucine, %   | 0.86                     | 0.81  | <b>0.76</b>  | 0.71  | 0.68  | 0.70                            | 0.66  | <b>0.62</b>  | 0.59  | 0.56  | 0.66                      | 0.62  | <b>0.59</b>  | 0.56  | 0.53  | 0.66                         | 0.62  | <b>0.59</b>  | 0.56  | 0.53  |
| Valine, %   | 0.98                     | 0.92  | <b>0.86</b>  | 0.81  | 0.77  | 0.79                            | 0.75  | <b>0.71</b>  | 0.68  | 0.64  | 0.75                      | 0.71  | <b>0.67</b>  | 0.64  | 0.61  | 0.75                         | 0.71  | <b>0.67</b>  | 0.64  | 0.61  |
| <b>Total amino acids<sup>3</sup></b>                    |                          |       |              |       |       |                                 |       |              |       |       |                           |       |              |       |       |                              |       |              |       |       |
| Lysine, %   | 1.19                     | 1.12  | <b>1.05</b>  | 0.99  | 0.94  | 0.97                            | 0.91  | <b>0.86</b>  | 0.82  | 0.78  | 0.91                      | 0.86  | <b>0.82</b>  | 0.78  | 0.74  | 0.92                         | 0.86  | <b>0.82</b>  | 0.78  | 0.74  |
| Methionine, %   | 0.57                     | 0.54  | <b>0.50</b>  | 0.48  | 0.45  | 0.46                            | 0.44  | <b>0.42</b>  | 0.40  | 0.38  | 0.44                      | 0.42  | <b>0.39</b>  | 0.37  | 0.36  | 0.43                         | 0.41  | <b>0.39</b>  | 0.37  | 0.35  |
| Methionine+cystine, %                                   | 1.03                     | 0.97  | <b>0.91</b>  | 0.86  | 0.81  | 0.84                            | 0.79  | <b>0.75</b>  | 0.71  | 0.68  | 0.79                      | 0.75  | <b>0.71</b>  | 0.67  | 0.64  | 0.77                         | 0.73  | <b>0.69</b>  | 0.66  | 0.62  |
| Threonine, %  | 0.90                     | 0.84  | <b>0.79</b>  | 0.74  | 0.71  | 0.73                            | 0.69  | <b>0.65</b>  | 0.62  | 0.59  | 0.69                      | 0.65  | <b>0.62</b>  | 0.59  | 0.56  | 0.69                         | 0.65  | <b>0.62</b>  | 0.58  | 0.56  |
| Tryptophan, %   | 0.27                     | 0.26  | <b>0.24</b>  | 0.23  | 0.21  | 0.22                            | 0.21  | <b>0.20</b>  | 0.19  | 0.18  | 0.21                      | 0.20  | <b>0.19</b>  | 0.18  | 0.17  | 0.21                         | 0.20  | <b>0.19</b>  | 0.18  | 0.17  |
| Arginine, %   | 1.25                     | 1.17  | <b>1.10</b>  | 1.04  | 0.99  | 1.02                            | 0.96  | <b>0.91</b>  | 0.86  | 0.82  | 0.96                      | 0.91  | <b>0.86</b>  | 0.82  | 0.78  | 0.96                         | 0.91  | <b>0.86</b>  | 0.82  | 0.78  |
| Isoleucine, %   | 0.92                     | 0.87  | <b>0.81</b>  | 0.77  | 0.73  | 0.75                            | 0.71  | <b>0.67</b>  | 0.64  | 0.61  | 0.71                      | 0.67  | <b>0.63</b>  | 0.60  | 0.57  | 0.71                         | 0.67  | <b>0.63</b>  | 0.60  | 0.57  |
| Valine, %   | 1.08                     | 1.01  | <b>0.95</b>  | 0.90  | 0.85  | 0.88                            | 0.83  | <b>0.78</b>  | 0.74  | 0.71  | 0.83                      | 0.78  | <b>0.74</b>  | 0.71  | 0.67  | 0.83                         | 0.78  | <b>0.74</b>  | 0.70  | 0.67  |
| Crude protein (nitrogen x 6.25), <sup>3</sup> %         | 21.62                    | 20.25 | <b>19.05</b> | 17.98 | 17.02 | 18.24                           | 17.22 | <b>16.32</b> | 15.50 | 14.76 | 17.94                     | 16.94 | <b>16.05</b> | 15.25 | 14.52 | 18.07                        | 17.05 | <b>16.13</b> | 15.31 | 14.56 |
| Calcium, <sup>4</sup> %                                 | 5.41                     | 5.06  | <b>4.76</b>  | 4.49  | 4.26  | 4.94                            | 4.67  | <b>4.42</b>  | 4.20  | 4.00  | 5.12                      | 4.83  | <b>4.58</b>  | 4.35  | 4.14  | 5.42                         | 5.11  | <b>4.84</b>  | 4.59  | 4.37  |
| Phosphorus (available), %                               | 0.68                     | 0.63  | <b>0.60</b>  | 0.56  | 0.53  | 0.56                            | 0.53  | <b>0.51</b>  | 0.48  | 0.46  | 0.54                      | 0.51  | <b>0.48</b>  | 0.46  | 0.44  | 0.48                         | 0.45  | <b>0.43</b>  | 0.41  | 0.39  |
| Sodium, %   | 0.24                     | 0.23  | <b>0.21</b>  | 0.20  | 0.19  | 0.21                            | 0.20  | <b>0.19</b>  | 0.18  | 0.17  | 0.21                      | 0.20  | <b>0.19</b>  | 0.18  | 0.17  | 0.22                         | 0.20  | <b>0.19</b>  | 0.18  | 0.17  |
| Chloride, %   | 0.24                     | 0.23  | <b>0.21</b>  | 0.20  | 0.19  | 0.21                            | 0.20  | <b>0.19</b>  | 0.18  | 0.17  | 0.21                      | 0.20  | <b>0.19</b>  | 0.18  | 0.17  | 0.22                         | 0.20  | <b>0.19</b>  | 0.18  | 0.17  |
| Linoleic acid, (C18:2 n-6), %                           | 1.35                     | 1.27  | <b>1.19</b>  | 1.12  | 1.06  | 1.18                            | 1.11  | <b>1.05</b>  | 1.00  | 0.95  | 1.18                      | 1.11  | <b>1.05</b>  | 1.00  | 0.95  | 1.20                         | 1.14  | <b>1.08</b>  | 1.02  | 0.97  |

\*Typical feed consumption for the age based on available data.

<sup>1</sup> Consumption of amino acids, fat, linoleic acid, and/or energy may be changed to optimize egg size.

<sup>2</sup> The recommended energy range is based on the energy values shown in the Hy-Line Online Management Guide. Differences in the metabolizable energy value assigned to feed ingredients of the same name can differ substantially; in some cases, the recommended dietary energy content may have to be adjusted accordingly (see Hy-Line Online Management Guide for additional information).

<sup>3</sup> Total amino acids are only appropriate with a corn and soybean meal diet; please formulate the diet on digestible amino acid basis if a substantial amount of other protein-supplying ingredients are used.

<sup>4</sup> Approximately 65% of the added calcium carbonate (limestone) should be in particle sizes of 2–4 mm.

**Non-Fast Molting Recommendations**

**Non-Fast Molting**

Many producers use a Non-Fast Molting Program to induce molting. The Hy-Line laying hens will perform very well after a rest, particularly in the latter weeks of the molt cycle with excellent shell quality and persistency. The optimum age for molting depends on the current flocks' performance, local egg markets, and scheduling of the next pullet flock, but is usually around 65 to 75 weeks of age.

Induced molting can extend the productive life of a flock by improving rate of lay, shell quality, and albumen height. However, these levels will be somewhat lower than the best pre-molt values. Egg size will essentially remain unaffected and will continue to increase after egg production resumes.

Free access to water at all times during the non-fast molt is essential. It is important to know the sodium (Na) content of the drinking water. High sodium levels (i.e., 100 ppm or higher) can adversely affect this molt program.

The best post-molt egg production is achieved after a complete cessation of egg production that lasts for at least 2 weeks and a concomitant loss of body weight to the 18 week target weight. After the initial body weight loss, the body weight can be held steady by a combination of adjusting the number of feedings per day and/or a shift to a higher-energy (laying-hen-type) diet.

Because of the importance of the body weight loss during molt, it is recommended to closely monitor the body weight of the flock during the molt process. Body weights should be collected twice per week from the same cages every time. The cages should be selected from bottom, middle, and top tiers; all rows; and from the front, middle, and end of the house.

The following table outlines the recommendations for the Non-Fast Molting Program recommended by Hy-Line.

| Molt day | Light                 | Feed type               | Feed modification <sup>1</sup>   | Feed intake <sup>2</sup>                 | House temperature <sup>3</sup> | Comments  |
|----------|-----------------------|-------------------------|--|--|--------------------------------|---|
|          | Hours per day         |                         |  | g/day per bird<br>(lb/day per 100 birds) | °C (°F)                        |   |
| -7 to -5 | 16                    | Layer diet              | Fine-particle CaCO <sub>3</sub>  | Full feed                                | 24–25 (75–77)                  | Fine-particle CaCO <sub>3</sub> diet: Remove all large-particle size CaCO <sub>3</sub> and replace with fine-particle CaCO <sub>3</sub> (less than 2 mm mean diameter). Do NOT change the percent calcium in the laying-hen diet.         |
| -4 to -1 | 24                    | Layer diet              | Fine-particle CaCO <sub>3</sub> , no added salt (NaCl)                           | Full feed                                | 24–25 (75–77)                  |   |
| 0–6      | 6–8 <sup>4</sup>      | Molt diet <sup>5</sup>  | Fine-particle CaCO <sub>3</sub>  | 54–64<br>(12–14)                         | 27–28 (80–82)                  | The higher house temperatures will help reduce feed intake and, in turn, facilitate a reduction in body weight to the 18 week target weight (note that white laying hens should not lose more than 24–25% of their pre-molt body weight). |
| 7–17     | 6–8                   | Molt diet               | —  | 54-64 (12–14)                            | 27–28 (80–82)                  | Maintain body weight.   |
| 18–19    | 12 or 16 <sup>6</sup> | Layer diet <sup>7</sup> | Mixture of fine- and coarse-particle CaCO <sub>3</sub> as in a normal layer diet | 64–73<br>(14–16)                         | 27–28 (80–82)                  | Control (limit) feed intake to avoid fat birds.   |
| 20–21    | 16 <sup>6</sup>       | Layer diet <sup>7</sup> | —  | Full feed                                | 26–27 (78–80)                  | Lower house temperature as needed to increase feed intake.  |
| 22–24    | 16                    | Layer diet <sup>7</sup> | —  | Full feed <sup>7</sup>                   | 24–25 (75–77)                  | Lower the ambient temperature to “normal.”  |

<sup>1</sup> Include a probiotic or a complex-carbohydrate product (e.g., mannan-oligo-saccharide; MOS) at 0.5 kg per metric ton (1 lb per 2000 lb) finished diet through all stages of the molt program.

<sup>2</sup> Feed intake depends on house temperature. Lower temperatures (colder) may require more feed.

<sup>3</sup> Depends on air quality in house. The suggested house temperatures may not be achievable in cold weather.

<sup>4</sup> Set lights at 8 hours or natural day length in open-sided houses. Normally, it is not necessary to change the light intensity.

<sup>5</sup> The molt diet is high in fiber (low in energy) and contains no added sodium (Na) (i.e., no added NaCl or NaHCO<sub>3</sub>).

<sup>6</sup> Light-stimulate the birds to bring the birds into production by increasing the light hours to the number of hours they were given before the molt (e.g., 15 or 16 hours). This increase can be performed over 1 week (i.e., from 8 hours to 16 hours in a single day) or over 2 weeks (i.e., from 8 to 12 hours and then from 12 to 16 hours). Monitor and control feed intake for the first few days after light stimulation to avoid fat birds as they are getting back into lay (which would significantly increase egg weight in the second cycle).

<sup>7</sup> According to the post-molt nutrition recommendations for the individual Hy-Line variety.

| Molt Nutrition Recommendations                  |             |
|---|-------------|
| Recommended concentration <sup>1</sup>          | Molt Diet   |
| Metabolizable energy, kcal/lb                   | 1180–1270   |
| Metabolizable energy, kcal/kg                   | 2600–2800   |
| Metabolizable energy, MJ/kg                     | 10.90–11.70 |
| <b>Minimum recommended concentration</b>        |             |
| <b>Standardized (true) ileal digestibility</b>  |             |
| Lysine, %                                       | 0.30        |
| Methionine, %                                   | 0.15        |
| Methionine+cystine, %                           | 0.32        |
| Threonine, %                                    | 0.18        |
| Tryptophan, %                                   | 0.10        |
| Arginine, %                                     | 0.38        |
| Isoleucine, %                                   | 0.18        |
| Valine, %                                       | 0.23        |
| <b>Total amino acids<sup>2</sup></b>            |             |
| Lysine, %                                       | 0.33        |
| Methionine, %                                   | 0.16        |
| Methionine+cystine, %                           | 0.36        |
| Threonine, %                                    | 0.21        |
| Tryptophan, %                                   | 0.12        |
| Arginine, %                                     | 0.41        |
| Isoleucine, %                                   | 0.20        |
| Valine, %                                       | 0.26        |
| Crude protein (nitrogen × 6.25), <sup>2</sup> % | 8.50        |
| Calcium, <sup>3</sup> %                         | 1.3–2.0     |
| Phosphorus (available), %                       | 0.25        |
| Sodium, <sup>4</sup> %                          | 0.03        |
| Chloride, %                                     | 0.03        |

<sup>1</sup> The recommended energy range is based on the energy values shown in the Hy-Line Online Management Guide. Differences in the metabolizable energy value assigned to feed ingredients of the same name can differ substantially; in some cases, the recommended dietary energy content may have to be adjusted accordingly (see Hy-Line Online Management Guide for additional information).

<sup>2</sup> Total amino acids are only appropriate with a corn and soybean meal diet; please formulate the diet on digestible amino acid basis if a substantial amount of other protein-supplying ingredients are used.

<sup>3</sup> The added calcium carbonate (limestone) should be in particle sizes of less than 2 mm.

<sup>4</sup> The sodium content in the Molt diet should not exceed 0.035%.

**Post-Molt Nutrition Recommendations**

After the Molt diet, formulate diets according to level of desired percentage egg production following the nutritional recommendations for first-cycle laying hens (see Hy-Line Online Management Guide), albeit with a 20 kcal/kg (10 kcal/lb, 0.10 MJ/kg) reduction in the dietary energy content. Other noticeable differences in the post-molt diets are an increased need for dietary calcium and a decreased need for dietary phosphorus, reflected in the table.

| Minimum recommended daily consumption | Peaking | Above 83% to 78% egg production | 77 to 75% egg production | Less than 75% egg production |
|---------------------------------------|---------|---------------------------------|--------------------------|------------------------------|
| Calcium, g/day                        | 4.35    | 4.55                            | 4.75                     | 4.95                         |
| Phosphorus (available), mg/day        | 500     | 450                             | 400                      | 350                          |

| Recommended post-molt dietary calcium and available phosphorus contents |      |      |       |      |      |
|---|------|------|-------|------|------|
| <b>Peaking</b>  |      |      |       |      |      |
| Feed consumption, g/day per bird  | 73   | 78   | 83*   | 89   | 93   |
| Feed consumption, lb/day per 100 birds                                  | 16.1 | 17.2 | 18.3* | 19.4 | 20.5 |
| Calcium, <sup>1</sup> %   | 5.96 | 5.58 | 5.24  | 4.94 | 4.68 |
| Phosphorus (available), %   | 0.68 | 0.64 | 0.60  | 0.57 | 0.54 |
| <b>Above 83% to 78% egg production</b>                                  |      |      |       |      |      |
| Feed consumption, g/day per bird  | 83   | 88   | 93*   | 98   | 103  |
| Feed consumption, lb/day per 100 birds                                  | 18.3 | 19.4 | 20.5* | 21.6 | 22.7 |
| Calcium, <sup>1</sup> %   | 5.48 | 5.17 | 4.89  | 4.64 | 4.42 |
| Phosphorus (available), %   | 0.54 | 0.51 | 0.48  | 0.46 | 0.44 |
| <b>77 to 75% egg production</b>   |      |      |       |      |      |
| Feed consumption, g/day per bird  | 85   | 90   | 95*   | 100  | 105  |
| Feed consumption, lb/day per 100 birds                                  | 18.7 | 19.8 | 20.9* | 22.1 | 23.2 |
| Calcium, <sup>1</sup> %   | 5.59 | 5.28 | 5.00  | 4.75 | 4.52 |
| Phosphorus (available), %   | 0.47 | 0.44 | 0.42  | 0.40 | 0.38 |
| <b>Less than 75% egg production</b>                                     |      |      |       |      |      |
| Feed consumption, g/day per bird  | 86   | 91   | 96*   | 101  | 106  |
| Feed consumption, lb/day per 100 birds                                  | 19.0 | 20.1 | 21.2* | 22.3 | 23.4 |
| Calcium, <sup>1</sup> %   | 5.76 | 5.44 | 5.16  | 4.90 | 4.67 |
| Phosphorus (available), %   | 0.41 | 0.38 | 0.36  | 0.35 | 0.33 |
| * Typical feed consumption based on available data.                     |      |      |       |      |      |

<sup>1</sup> Approximately 65% of the added calcium carbonate (limestone) should be in particle sizes of 2–4 mm.

| Performance Table |                      |                    |                      |                         |                    |                            |                    |             |      |                     |                    |                           |                  |                |                                |      |             |             |            |
|-------------------|----------------------|--------------------|----------------------|-------------------------|--------------------|----------------------------|--------------------|-------------|------|---------------------|--------------------|---------------------------|------------------|----------------|--------------------------------|------|-------------|-------------|------------|
| Age in Weeks      | % Hen-Day Production |                    | Mortality Cumulative | Hen-Day Eggs Cumulative |                    | Hen-Housed Eggs Cumulative |                    | Body Weight |      | Average Egg Weight* |                    | % Grade A Large and Above | Feed Consumption |                | Hen-Housed Egg Mass Cumulative |      | Egg Quality |             |            |
|                   | Optimum Conditions   | Average Conditions |                      | Optimum Conditions      | Average Conditions | Optimum Conditions         | Average Conditions | kg          | lb   | g/egg               | Net lb/30 doz case |                           | 23 oz/doz        | g/day per bird | lb/day per 100 birds           | kg   | lb          | Haugh Units | % Solids** |
| 18                | 0                    | 1                  | 0.04                 | 0.0                     | 0.1                | 0.0                        | 0.1                | 1.27        | 2.80 | 43.2                | 34.2               | -                         | 64               | 14.1           | 0.00                           | 0.01 | 98.0        | 22.4        | 4280       |
| 19                | 4                    | 3                  | 0.1                  | 0.3                     | 0.3                | 0.3                        | 0.3                | 1.30        | 2.87 | 44.3                | 35.2               | 1                         | 65               | 14.3           | 0.01                           | 0.03 | 97.8        | 22.5        | 4270       |
| 20                | 21                   | 15                 | 0.1                  | 1.8                     | 1.4                | 1.7                        | 1.4                | 1.35        | 2.98 | 45.8                | 36.4               | 2                         | 67               | 14.8           | 0.1                            | 0.1  | 97.6        | 22.9        | 4260       |
| 21                | 55                   | 38                 | 0.2                  | 5.6                     | 4.0                | 5.6                        | 4.0                | 1.40        | 3.09 | 47.4                | 37.6               | 6                         | 69               | 15.3           | 0.2                            | 0.4  | 97.2        | 23.1        | 4250       |
| 22                | 78                   | 62                 | 0.3                  | 11.1                    | 8.3                | 11.0                       | 8.3                | 1.45        | 3.20 | 49.6                | 39.3               | 14                        | 75               | 16.5           | 0.4                            | 0.9  | 96.8        | 23.2        | 4250       |
| 23                | 89                   | 78                 | 0.4                  | 17.3                    | 13.8               | 17.2                       | 13.8               | 1.47        | 3.24 | 51.4                | 40.8               | 25                        | 80               | 17.6           | 0.7                            | 1.5  | 96.4        | 23.4        | 4240       |
| 24                | 92                   | 86                 | 0.5                  | 23.7                    | 19.8               | 23.6                       | 19.8               | 1.48        | 3.26 | 52.9                | 42.0               | 36                        | 84               | 18.5           | 1.0                            | 2.2  | 96.0        | 23.5        | 4240       |
| 25                | 93                   | 90                 | 0.6                  | 30.2                    | 26.1               | 30.1                       | 26.0               | 1.50        | 3.31 | 53.9                | 42.8               | 45                        | 87               | 19.1           | 1.3                            | 2.9  | 95.6        | 23.6        | 4230       |
| 26                | 94                   | 91                 | 0.6                  | 36.8                    | 32.5               | 36.7                       | 32.4               | 1.50        | 3.31 | 54.9                | 43.6               | 53                        | 89               | 19.5           | 1.7                            | 3.7  | 95.3        | 23.7        | 4220       |
| 27                | 94                   | 92                 | 0.7                  | 43.4                    | 39.0               | 43.2                       | 38.8               | 1.51        | 3.33 | 55.5                | 44.1               | 58                        | 90               | 19.9           | 2.0                            | 4.5  | 95.0        | 23.8        | 4210       |
| 28                | 94                   | 93                 | 0.7                  | 50.0                    | 45.4               | 49.7                       | 45.2               | 1.51        | 3.33 | 56.3                | 44.7               | 64                        | 90               | 19.8           | 2.4                            | 5.3  | 94.6        | 23.9        | 4200       |
| 29                | 94                   | 92                 | 0.8                  | 56.6                    | 51.9               | 56.3                       | 51.6               | 1.52        | 3.35 | 56.9                | 45.2               | 69                        | 91               | 20.1           | 2.8                            | 6.1  | 94.2        | 24.0        | 4190       |
| 30                | 94                   | 92                 | 0.9                  | 63.1                    | 58.4               | 62.8                       | 58.0               | 1.52        | 3.35 | 57.5                | 45.6               | 73                        | 91               | 20.1           | 3.1                            | 6.9  | 93.9        | 24.1        | 4180       |
| 31                | 94                   | 92                 | 0.9                  | 69.7                    | 64.8               | 69.3                       | 64.4               | 1.52        | 3.35 | 57.8                | 45.9               | 75                        | 92               | 20.3           | 3.5                            | 7.7  | 93.6        | 24.2        | 4170       |
| 32                | 94                   | 92                 | 1.0                  | 76.3                    | 71.2               | 75.8                       | 70.8               | 1.52        | 3.35 | 58.2                | 46.2               | 78                        | 93               | 20.5           | 3.9                            | 8.5  | 93.2        | 24.3        | 4160       |
| 33                | 94                   | 92                 | 1.1                  | 82.9                    | 77.7               | 82.3                       | 77.1               | 1.52        | 3.35 | 58.5                | 46.4               | 80                        | 93               | 20.5           | 4.2                            | 9.4  | 92.9        | 24.4        | 4150       |
| 34                | 93                   | 91                 | 1.1                  | 89.4                    | 84.1               | 88.8                       | 83.5               | 1.52        | 3.35 | 58.9                | 46.7               | 83                        | 94               | 20.7           | 4.6                            | 10.2 | 92.6        | 24.4        | 4140       |
| 35                | 93                   | 91                 | 1.2                  | 95.9                    | 90.4               | 95.2                       | 89.8               | 1.52        | 3.35 | 59.2                | 47.0               | 84                        | 94               | 20.7           | 5.0                            | 11.0 | 92.3        | 24.5        | 4130       |
| 36                | 93                   | 91                 | 1.3                  | 102.4                   | 96.8               | 101.6                      | 96.0               | 1.52        | 3.35 | 59.5                | 47.3               | 87                        | 95               | 20.9           | 5.4                            | 11.8 | 92.0        | 24.5        | 4120       |
| 37                | 93                   | 90                 | 1.4                  | 108.9                   | 103.1              | 108.0                      | 102.3              | 1.52        | 3.35 | 59.8                | 47.5               | 88                        | 95               | 20.9           | 5.7                            | 12.7 | 91.7        | 24.6        | 4110       |
| 38                | 92                   | 90                 | 1.4                  | 115.4                   | 109.4              | 114.4                      | 108.5              | 1.52        | 3.35 | 60.1                | 47.7               | 90                        | 95               | 20.9           | 6.1                            | 13.5 | 91.4        | 24.6        | 4110       |
| 39                | 92                   | 90                 | 1.5                  | 121.8                   | 115.7              | 120.7                      | 114.7              | 1.53        | 3.37 | 60.2                | 47.8               | 90                        | 96               | 21.2           | 6.5                            | 14.3 | 91.1        | 24.6        | 4100       |
| 40                | 91                   | 89                 | 1.6                  | 128.2                   | 121.9              | 127.0                      | 120.8              | 1.53        | 3.37 | 60.4                | 47.9               | 90                        | 96               | 21.2           | 6.9                            | 15.1 | 90.8        | 24.6        | 4100       |
| 41                | 91                   | 89                 | 1.7                  | 134.5                   | 128.2              | 133.3                      | 126.9              | 1.53        | 3.37 | 60.6                | 48.1               | 91                        | 96               | 21.1           | 7.2                            | 15.9 | 90.5        | 24.6        | 4090       |
| 42                | 91                   | 88                 | 1.8                  | 140.9                   | 134.3              | 139.5                      | 133.0              | 1.53        | 3.37 | 60.8                | 48.2               | 91                        | 95               | 20.9           | 7.6                            | 16.7 | 90.3        | 24.7        | 4090       |
| 43                | 90                   | 88                 | 1.9                  | 147.2                   | 140.5              | 145.7                      | 139.0              | 1.53        | 3.37 | 60.9                | 48.3               | 91                        | 95               | 20.9           | 8.0                            | 17.6 | 90.0        | 24.7        | 4085       |
| 44                | 90                   | 87                 | 2.0                  | 153.5                   | 146.6              | 151.9                      | 145.0              | 1.53        | 3.37 | 61.0                | 48.4               | 91                        | 95               | 20.9           | 8.3                            | 18.4 | 89.7        | 24.7        | 4085       |
| 45                | 89                   | 87                 | 2.1                  | 159.7                   | 152.7              | 158.0                      | 151.0              | 1.53        | 3.37 | 61.1                | 48.5               | 92                        | 95               | 20.9           | 8.7                            | 19.2 | 89.5        | 24.7        | 4080       |
| 46                | 89                   | 87                 | 2.1                  | 166.0                   | 158.7              | 164.1                      | 156.9              | 1.54        | 3.40 | 61.1                | 48.5               | 91                        | 95               | 20.9           | 9.1                            | 20.0 | 89.2        | 24.7        | 4080       |
| 47                | 89                   | 86                 | 2.2                  | 172.2                   | 164.8              | 170.2                      | 162.8              | 1.54        | 3.40 | 61.2                | 48.6               | 91                        | 95               | 20.9           | 9.4                            | 20.8 | 89.1        | 24.7        | 4075       |
| 48                | 88                   | 85                 | 2.3                  | 178.4                   | 170.8              | 176.2                      | 168.6              | 1.54        | 3.40 | 61.3                | 48.6               | 91                        | 95               | 20.9           | 9.8                            | 21.5 | 88.9        | 24.7        | 4075       |
| 49                | 87                   | 85                 | 2.4                  | 184.5                   | 176.7              | 182.1                      | 174.4              | 1.54        | 3.40 | 61.3                | 48.7               | 91                        | 95               | 20.9           | 10.1                           | 22.3 | 88.6        | 24.7        | 4070       |
| 50                | 87                   | 85                 | 2.5                  | 190.5                   | 182.6              | 188.1                      | 180.2              | 1.54        | 3.40 | 61.3                | 48.7               | 91                        | 95               | 20.9           | 10.5                           | 23.1 | 88.5        | 24.7        | 4070       |
| 51                | 87                   | 84                 | 2.6                  | 196.6                   | 188.5              | 194.0                      | 185.9              | 1.54        | 3.40 | 61.5                | 48.8               | 91                        | 95               | 20.9           | 10.8                           | 23.9 | 88.3        | 24.7        | 4065       |
| 52                | 86                   | 83                 | 2.7                  | 202.7                   | 194.4              | 199.8                      | 191.6              | 1.54        | 3.40 | 61.6                | 48.9               | 91                        | 95               | 20.9           | 11.2                           | 24.7 | 88.1        | 24.7        | 4065       |
| 53                | 86                   | 83                 | 2.8                  | 208.7                   | 200.2              | 205.7                      | 197.3              | 1.54        | 3.40 | 61.6                | 48.9               | 91                        | 94               | 20.7           | 11.5                           | 25.4 | 87.9        | 24.7        | 4060       |
| 54                | 85                   | 83                 | 2.9                  | 214.6                   | 206.0              | 211.5                      | 202.9              | 1.54        | 3.40 | 61.7                | 49.0               | 90                        | 94               | 20.7           | 11.9                           | 26.2 | 87.7        | 24.7        | 4060       |
| 55                | 85                   | 82                 | 3.0                  | 220.6                   | 211.7              | 217.2                      | 208.5              | 1.54        | 3.40 | 61.8                | 49.1               | 90                        | 94               | 20.7           | 12.2                           | 27.0 | 87.6        | 24.7        | 4050       |
| 56                | 85                   | 82                 | 3.1                  | 226.5                   | 217.4              | 223.0                      | 214.0              | 1.54        | 3.40 | 62.0                | 49.2               | 90                        | 94               | 20.7           | 12.6                           | 27.7 | 87.5        | 24.7        | 4050       |
| 57                | 84                   | 81                 | 3.2                  | 232.4                   | 223.1              | 228.7                      | 219.5              | 1.54        | 3.40 | 62.0                | 49.2               | 90                        | 94               | 20.7           | 12.9                           | 28.5 | 87.3        | 24.7        | 4045       |
| 58                | 84                   | 81                 | 3.3                  | 238.3                   | 228.8              | 234.4                      | 225.0              | 1.54        | 3.40 | 62.1                | 49.3               | 90                        | 94               | 20.7           | 13.2                           | 29.2 | 87.2        | 24.7        | 4045       |
| 59                | 83                   | 81                 | 3.4                  | 244.1                   | 234.4              | 240.0                      | 230.5              | 1.54        | 3.40 | 62.2                | 49.3               | 90                        | 94               | 20.7           | 13.6                           | 30.0 | 87.1        | 24.7        | 4040       |
| 60                | 83                   | 80                 | 3.5                  | 249.9                   | 240.1              | 245.6                      | 235.9              | 1.54        | 3.40 | 62.2                | 49.3               | 90                        | 94               | 20.7           | 13.9                           | 30.7 | 87.0        | 24.7        | 4040       |

\* Egg weights after 40 weeks of age assume phase feeding of protein to limit egg size.

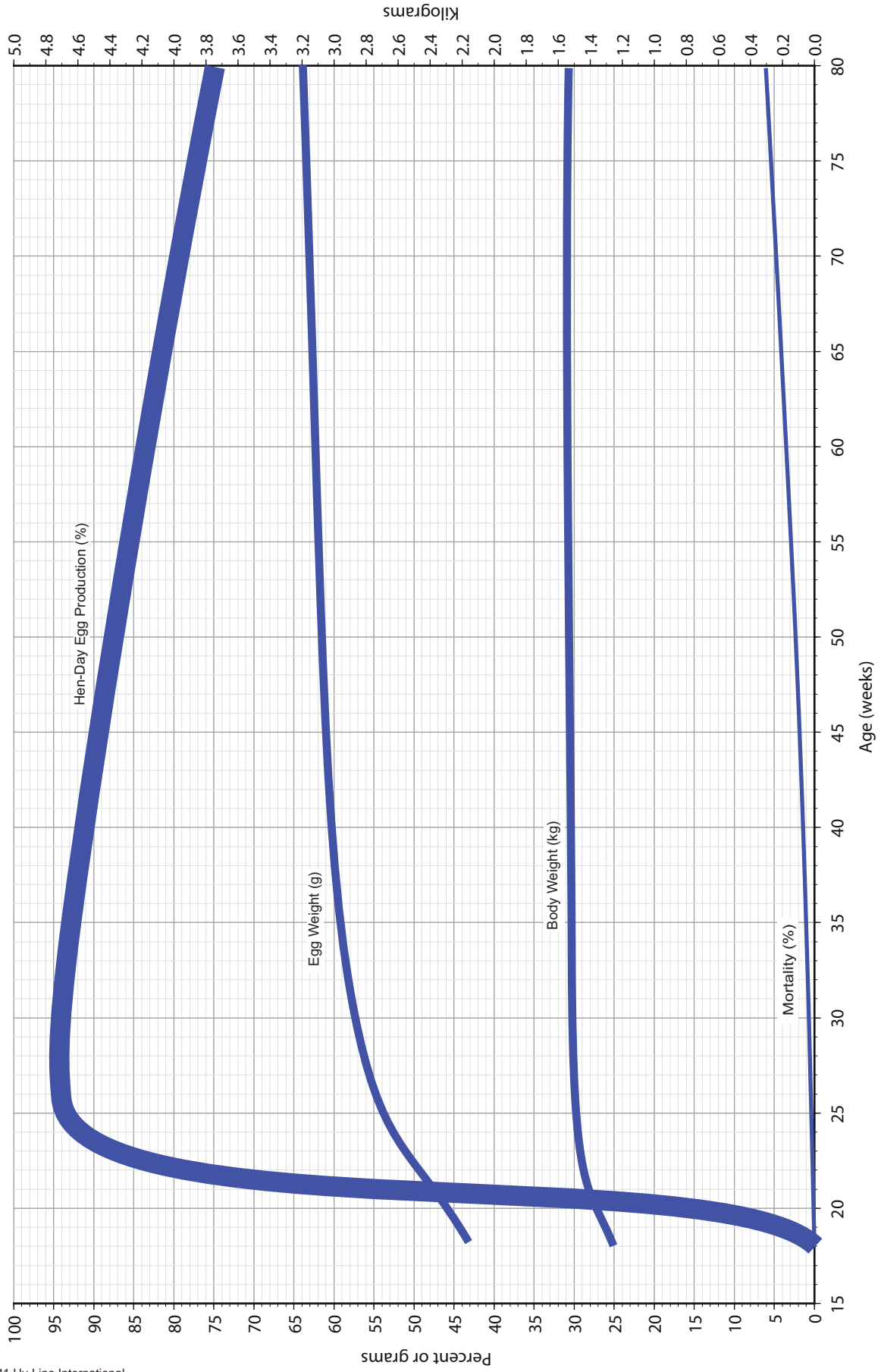
\*\* Percent solids in liquid egg mix of white and yolk.

| Performance Table |                      |                    |                      |                         |                    |                            |                    |             |      |                     |                    |                           |                  |                      |                                |      |             |            |                   |
|-------------------|----------------------|--------------------|----------------------|-------------------------|--------------------|----------------------------|--------------------|-------------|------|---------------------|--------------------|---------------------------|------------------|----------------------|--------------------------------|------|-------------|------------|-------------------|
| Age in Weeks      | % Hen-Day Production |                    | Mortality Cumulative | Hen-Day Eggs Cumulative |                    | Hen-Housed Eggs Cumulative |                    | Body Weight |      | Average Egg Weight* |                    | % Grade A Large and Above | Feed Consumption |                      | Hen-Housed Egg Mass Cumulative |      | Egg Quality |            |                   |
|                   | Optimum Conditions   | Average Conditions | %                    | Optimum Conditions      | Average Conditions | Optimum Conditions         | Average Conditions | kg          | lb   | g/egg               | Net lb/30 doz case | 23 oz/doz                 | g/day per bird   | lb/day per 100 birds | kg                             | lb   | Haugh Units | % Solids** | Breaking Strength |
| 61                | 83                   | 80                 | 3.6                  | 255.7                   | 245.6              | 251.2                      | 241.3              | 1.54        | 3.40 | 62.3                | 49.4               | 90                        | 94               | 20.7                 | 14.3                           | 31.4 | 86.9        | 24.7       | 4035              |
| 62                | 82                   | 79                 | 3.8                  | 261.5                   | 251.2              | 256.7                      | 246.6              | 1.54        | 3.40 | 62.3                | 49.4               | 90                        | 93               | 20.5                 | 14.6                           | 32.2 | 86.8        | 24.7       | 4030              |
| 63                | 82                   | 78                 | 3.9                  | 267.2                   | 256.7              | 262.2                      | 251.9              | 1.54        | 3.40 | 62.5                | 49.6               | 90                        | 93               | 20.5                 | 14.9                           | 32.9 | 86.7        | 24.7       | 4020              |
| 64                | 81                   | 78                 | 4.0                  | 272.9                   | 262.1              | 267.7                      | 257.1              | 1.54        | 3.40 | 62.5                | 49.6               | 90                        | 93               | 20.5                 | 15.3                           | 33.6 | 86.6        | 24.7       | 4010              |
| 65                | 81                   | 77                 | 4.1                  | 278.5                   | 267.6              | 273.1                      | 262.3              | 1.54        | 3.40 | 62.6                | 49.7               | 90                        | 93               | 20.5                 | 15.6                           | 34.3 | 86.5        | 24.7       | 4005              |
| 66                | 80                   | 77                 | 4.3                  | 284.1                   | 272.9              | 278.5                      | 267.5              | 1.54        | 3.40 | 62.6                | 49.7               | 90                        | 93               | 20.5                 | 15.9                           | 35.1 | 86.4        | 24.7       | 3990              |
| 67                | 80                   | 76                 | 4.4                  | 289.7                   | 278.3              | 283.8                      | 272.6              | 1.54        | 3.40 | 62.6                | 49.7               | 90                        | 93               | 20.5                 | 16.2                           | 35.8 | 86.3        | 24.7       | 3985              |
| 68                | 80                   | 76                 | 4.5                  | 295.3                   | 283.6              | 289.2                      | 277.6              | 1.54        | 3.40 | 62.7                | 49.7               | 90                        | 93               | 20.5                 | 16.5                           | 36.5 | 86.2        | 24.7       | 3970              |
| 69                | 80                   | 76                 | 4.7                  | 300.9                   | 288.9              | 294.5                      | 282.7              | 1.54        | 3.40 | 62.9                | 49.9               | 90                        | 93               | 20.5                 | 16.9                           | 37.2 | 86.1        | 24.7       | 3960              |
| 70                | 80                   | 76                 | 4.8                  | 306.5                   | 294.2              | 299.9                      | 287.7              | 1.54        | 3.40 | 62.9                | 50.0               | 90                        | 93               | 20.5                 | 17.2                           | 37.9 | 86.0        | 24.7       | 3955              |
| 71                | 80                   | 75                 | 4.9                  | 312.1                   | 299.4              | 305.2                      | 292.7              | 1.54        | 3.40 | 63.1                | 50.1               | 90                        | 93               | 20.5                 | 17.5                           | 38.6 | 85.9        | 24.7       | 3950              |
| 72                | 80                   | 75                 | 5.1                  | 317.7                   | 304.7              | 310.5                      | 297.7              | 1.54        | 3.40 | 63.1                | 50.1               | 90                        | 93               | 20.5                 | 17.8                           | 39.2 | 85.8        | 24.7       | 3945              |
| 73                | 80                   | 75                 | 5.2                  | 323.3                   | 310.0              | 315.8                      | 302.7              | 1.54        | 3.40 | 63.1                | 50.1               | 90                        | 93               | 20.5                 | 18.1                           | 39.9 | 85.7        | 24.7       | 3940              |
| 74                | 79                   | 74                 | 5.4                  | 328.9                   | 315.2              | 321.0                      | 307.6              | 1.54        | 3.40 | 63.4                | 50.3               | 90                        | 93               | 20.5                 | 18.4                           | 40.6 | 85.6        | 24.7       | 3940              |
| 75                | 79                   | 74                 | 5.5                  | 334.4                   | 320.3              | 326.3                      | 312.5              | 1.54        | 3.40 | 63.5                | 50.4               | 90                        | 93               | 20.5                 | 18.7                           | 41.3 | 85.5        | 24.7       | 3930              |
| 76                | 78                   | 74                 | 5.6                  | 339.9                   | 325.5              | 331.4                      | 317.4              | 1.54        | 3.40 | 63.5                | 50.4               | 90                        | 93               | 20.5                 | 19.0                           | 42.0 | 85.4        | 24.7       | 3930              |
| 77                | 78                   | 72                 | 5.8                  | 345.3                   | 330.5              | 336.6                      | 322.2              | 1.54        | 3.40 | 63.8                | 50.6               | 90                        | 93               | 20.5                 | 19.4                           | 42.7 | 85.3        | 24.7       | 3920              |
| 78                | 77                   | 72                 | 5.9                  | 350.7                   | 335.6              | 341.6                      | 326.9              | 1.54        | 3.40 | 63.8                | 50.7               | 90                        | 93               | 20.5                 | 19.7                           | 43.3 | 85.2        | 24.7       | 3920              |
| 79                | 76                   | 71                 | 6.1                  | 356.0                   | 340.6              | 346.6                      | 331.6              | 1.54        | 3.40 | 63.9                | 50.7               | 90                        | 93               | 20.5                 | 20.0                           | 44.0 | 85.1        | 24.7       | 3910              |
| 80                | 75                   | 70                 | 6.2                  | 361.3                   | 345.5              | 351.5                      | 336.2              | 1.54        | 3.40 | 63.9                | 50.7               | 90                        | 93               | 20.5                 | 20.2                           | 44.6 | 85.0        | 24.7       | 3910              |

\* Egg weights after 40 weeks of age assume phase feeding of protein to limit egg size.

\*\* Percent solids in liquid egg mix of white and yolk.

Performance Graph

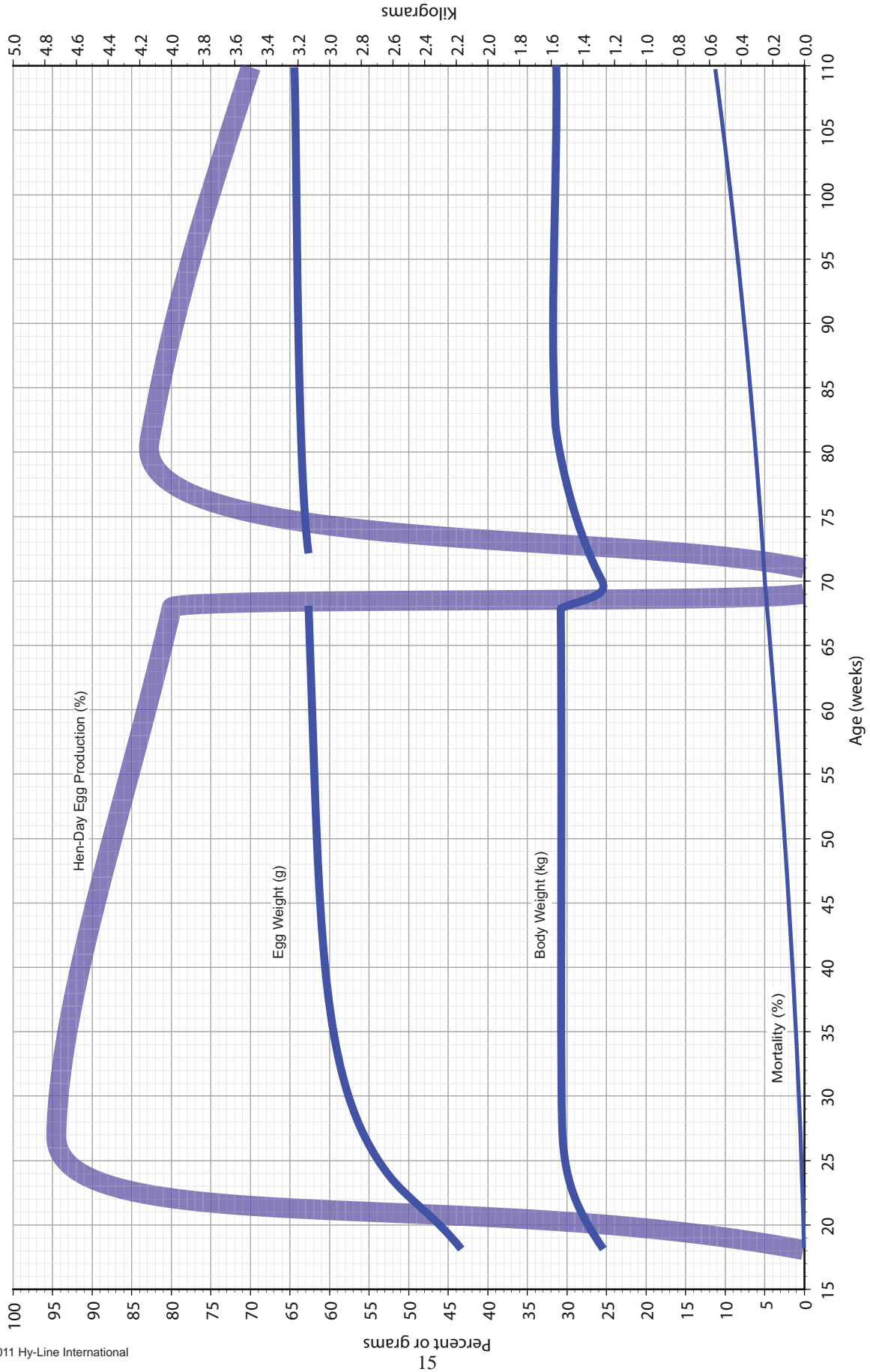


| Post-Molt Performance Table |                      |                        |                    |                       |             |      |                     |                    |                                     |                  |                      |                                |      |
|-----------------------------|----------------------|------------------------|--------------------|-----------------------|-------------|------|---------------------|--------------------|-------------------------------------|------------------|----------------------|--------------------------------|------|
| Age in Weeks                | % Hen-Day Production | % Mortality Cumulative | Hen-Day Cumulative | Hen-Housed Cumulative | Body Weight |      | Average Egg Weight* |                    | % Grade A Large and Above 23 oz/doz | Feed Consumption |                      | Hen-Housed Egg Mass Cumulative |      |
|                             |                      |                        |                    |                       | kg          | lb   | g/egg               | Net lb/30 doz case |                                     | g/day per bird   | lb/day per 100 birds | kg                             | lb   |
| 69                          | 0                    | 4.7                    | 280.8              | 274.9                 | 1.30        | 2.87 | -                   | -                  | -                                   | -                | -                    | 16.3                           | 36.0 |
| 70                          | 0                    | 4.8                    | 280.8              | 274.9                 | 1.27        | 2.80 | -                   | -                  | -                                   | 40               | 8.8                  | 16.3                           | 36.0 |
| 71                          | 0                    | 4.9                    | 280.8              | 274.9                 | 1.30        | 2.87 | -                   | -                  | -                                   | 60               | 13.2                 | 16.3                           | 36.0 |
| 72                          | 11                   | 5.0                    | 281.5              | 275.7                 | 1.35        | 2.97 | 62.5                | 49.6               | 91                                  | 78               | 17.2                 | 16.4                           | 36.1 |
| 73                          | 33                   | 5.2                    | 283.8              | 277.9                 | 1.39        | 3.07 | 62.6                | 49.7               | 91                                  | 83               | 18.3                 | 16.5                           | 36.4 |
| 74                          | 56                   | 5.3                    | 287.8              | 281.6                 | 1.44        | 3.17 | 63.0                | 50.0               | 92                                  | 86               | 19.0                 | 16.8                           | 37.0 |
| 75                          | 67                   | 5.4                    | 292.4              | 286.0                 | 1.44        | 3.17 | 63.1                | 50.1               | 92                                  | 88               | 19.4                 | 17.0                           | 37.6 |
| 76                          | 75                   | 5.5                    | 297.7              | 291.0                 | 1.46        | 3.21 | 63.2                | 50.2               | 92                                  | 89               | 19.6                 | 17.4                           | 38.3 |
| 77                          | 79                   | 5.6                    | 303.2              | 296.2                 | 1.49        | 3.28 | 63.3                | 50.2               | 92                                  | 90               | 19.8                 | 17.7                           | 39.0 |
| 78                          | 81                   | 5.8                    | 308.9              | 301.5                 | 1.51        | 3.32 | 63.3                | 50.2               | 92                                  | 92               | 20.3                 | 18.0                           | 39.7 |
| 79                          | 82                   | 5.9                    | 314.6              | 306.9                 | 1.53        | 3.36 | 63.4                | 50.3               | 92                                  | 93               | 20.3                 | 18.4                           | 40.5 |
| 80                          | 82                   | 6.0                    | 320.4              | 312.3                 | 1.55        | 3.41 | 63.4                | 50.3               | 91                                  | 93               | 20.3                 | 18.7                           | 41.3 |
| 81                          | 82                   | 6.2                    | 326.1              | 317.7                 | 1.56        | 3.43 | 63.4                | 50.3               | 91                                  | 93               | 20.5                 | 19.1                           | 42.0 |
| 82                          | 83                   | 6.3                    | 331.9              | 323.2                 | 1.57        | 3.45 | 63.4                | 50.3               | 91                                  | 93               | 20.5                 | 19.4                           | 42.8 |
| 83                          | 83                   | 6.5                    | 337.7              | 328.6                 | 1.57        | 3.47 | 63.5                | 50.4               | 91                                  | 93               | 20.5                 | 19.7                           | 43.5 |
| 84                          | 82                   | 6.6                    | 343.5              | 334.0                 | 1.57        | 3.47 | 63.5                | 50.4               | 91                                  | 93               | 20.5                 | 20.1                           | 44.3 |
| 85                          | 81                   | 6.8                    | 349.1              | 339.2                 | 1.57        | 3.47 | 63.5                | 50.4               | 91                                  | 93               | 20.5                 | 20.4                           | 45.0 |
| 86                          | 81                   | 6.9                    | 354.8              | 344.5                 | 1.57        | 3.47 | 63.5                | 50.4               | 91                                  | 93               | 20.5                 | 20.8                           | 45.8 |
| 87                          | 80                   | 7.1                    | 360.4              | 349.7                 | 1.57        | 3.47 | 63.5                | 50.4               | 91                                  | 93               | 20.5                 | 21.1                           | 46.5 |
| 88                          | 80                   | 7.3                    | 366.0              | 354.9                 | 1.57        | 3.47 | 63.5                | 50.4               | 91                                  | 93               | 20.5                 | 21.4                           | 47.2 |
| 89                          | 79                   | 7.4                    | 371.5              | 360.0                 | 1.57        | 3.47 | 63.5                | 50.4               | 90                                  | 94               | 20.7                 | 21.7                           | 47.9 |
| 90                          | 79                   | 7.6                    | 377.1              | 365.1                 | 1.57        | 3.47 | 63.5                | 50.4               | 90                                  | 94               | 20.7                 | 22.1                           | 48.6 |
| 91                          | 79                   | 7.7                    | 382.6              | 370.2                 | 1.57        | 3.47 | 63.6                | 50.5               | 90                                  | 94               | 20.7                 | 22.4                           | 49.4 |
| 92                          | 78                   | 7.9                    | 388.1              | 375.3                 | 1.57        | 3.47 | 63.6                | 50.5               | 90                                  | 94               | 20.7                 | 22.7                           | 50.1 |
| 93                          | 78                   | 8.1                    | 393.5              | 380.3                 | 1.57        | 3.47 | 63.6                | 50.5               | 90                                  | 94               | 20.7                 | 23.0                           | 50.8 |
| 94                          | 78                   | 8.3                    | 399.0              | 385.3                 | 1.57        | 3.47 | 63.7                | 50.6               | 90                                  | 94               | 20.7                 | 23.3                           | 51.5 |
| 95                          | 77                   | 8.4                    | 404.4              | 390.2                 | 1.57        | 3.47 | 63.7                | 50.6               | 90                                  | 94               | 20.7                 | 23.7                           | 52.2 |
| 96                          | 77                   | 8.6                    | 409.8              | 395.2                 | 1.57        | 3.47 | 63.7                | 50.6               | 90                                  | 95               | 20.9                 | 24.0                           | 52.9 |
| 97                          | 77                   | 8.8                    | 415.2              | 400.1                 | 1.57        | 3.47 | 63.8                | 50.6               | 90                                  | 95               | 20.9                 | 24.3                           | 53.6 |
| 98                          | 76                   | 9.0                    | 420.5              | 404.9                 | 1.57        | 3.47 | 63.8                | 50.6               | 90                                  | 95               | 20.9                 | 24.6                           | 54.2 |
| 99                          | 76                   | 9.1                    | 425.8              | 409.8                 | 1.57        | 3.47 | 63.8                | 50.6               | 90                                  | 95               | 20.9                 | 24.9                           | 54.9 |
| 100                         | 75                   | 9.3                    | 431.0              | 414.5                 | 1.57        | 3.47 | 63.9                | 50.7               | 90                                  | 95               | 20.9                 | 25.2                           | 55.6 |
| 101                         | 75                   | 9.5                    | 436.3              | 419.3                 | 1.57        | 3.47 | 63.9                | 50.7               | 90                                  | 95               | 20.9                 | 25.5                           | 56.3 |
| 102                         | 74                   | 9.7                    | 441.5              | 423.9                 | 1.57        | 3.47 | 64.0                | 50.8               | 90                                  | 96               | 21.2                 | 25.8                           | 56.9 |
| 103                         | 74                   | 9.9                    | 446.7              | 428.6                 | 1.57        | 3.47 | 64.0                | 50.8               | 90                                  | 96               | 21.2                 | 26.1                           | 57.6 |
| 104                         | 74                   | 10.1                   | 451.8              | 433.3                 | 1.57        | 3.47 | 64.1                | 50.9               | 90                                  | 96               | 21.2                 | 26.4                           | 58.2 |
| 105                         | 73                   | 10.3                   | 456.9              | 437.9                 | 1.57        | 3.47 | 64.1                | 50.9               | 90                                  | 96               | 21.2                 | 26.7                           | 58.9 |
| 106                         | 72                   | 10.5                   | 462.0              | 442.4                 | 1.57        | 3.47 | 64.2                | 51.0               | 90                                  | 96               | 21.2                 | 27.0                           | 59.5 |
| 107                         | 71                   | 10.7                   | 467.0              | 446.8                 | 1.57        | 3.47 | 64.2                | 51.0               | 90                                  | 97               | 21.4                 | 27.3                           | 60.1 |
| 108                         | 71                   | 10.9                   | 471.9              | 451.2                 | 1.57        | 3.47 | 64.3                | 51.0               | 89                                  | 97               | 21.4                 | 27.6                           | 60.8 |
| 109                         | 70                   | 11.1                   | 476.8              | 455.6                 | 1.57        | 3.47 | 64.3                | 51.0               | 89                                  | 98               | 21.6                 | 27.8                           | 61.4 |
| 110                         | 70                   | 11.3                   | 481.7              | 459.9                 | 1.57        | 3.47 | 64.4                | 51.1               | 89                                  | 98               | 21.6                 | 28.1                           | 62.0 |

\* These egg weights are those which can be achieved through controlled feeding of protein. Larger egg sizes can be achieved by feeding higher protein levels.



Post-Molt Performance Graph



| Egg Size Distribution—E.U. Standards |                        |                      |               |                |               |
|--------------------------------------|------------------------|----------------------|---------------|----------------|---------------|
| Age in Weeks                         | Average Egg Weight (g) | Very Large Over 73 g | Large 63–73 g | Medium 53–63 g | Small 43–53 g |
| 22                                   | 49.6                   | 0.0                  | 0.1           | 21.9           | 78.0          |
| 24                                   | 52.9                   | 0.0                  | 1.4           | 47.7           | 50.9          |
| 26                                   | 54.9                   | 0.0                  | 4.2           | 61.5           | 34.3          |
| 28                                   | 56.3                   | 0.0                  | 7.7           | 68.2           | 24.1          |
| 30                                   | 57.5                   | 0.0                  | 11.6          | 72.0           | 16.4          |
| 32                                   | 58.2                   | 0.1                  | 14.3          | 73.3           | 12.4          |
| 34                                   | 58.9                   | 0.1                  | 17.5          | 73.4           | 9.0           |
| 36                                   | 59.5                   | 0.1                  | 20.7          | 72.7           | 6.6           |
| 38                                   | 60.1                   | 0.1                  | 24.4          | 71.0           | 4.6           |
| 40                                   | 60.4                   | 0.2                  | 27.1          | 68.5           | 4.3           |
| 42                                   | 60.8                   | 0.2                  | 30.2          | 66.1           | 3.5           |
| 44                                   | 61.0                   | 0.3                  | 32.2          | 64.1           | 3.5           |
| 46                                   | 61.1                   | 0.3                  | 33.0          | 63.4           | 3.3           |
| 48                                   | 61.3                   | 0.5                  | 34.8          | 61.5           | 3.3           |
| 50                                   | 61.3                   | 0.6                  | 35.0          | 61.2           | 3.3           |
| 52                                   | 61.6                   | 0.7                  | 37.4          | 58.9           | 3.1           |
| 54                                   | 61.7                   | 0.8                  | 38.3          | 57.8           | 3.1           |
| 56                                   | 62.0                   | 1.0                  | 40.6          | 55.4           | 3.0           |
| 58                                   | 62.1                   | 1.2                  | 41.4          | 54.5           | 2.9           |
| 60                                   | 62.2                   | 1.4                  | 42.4          | 53.4           | 2.9           |
| 62                                   | 62.3                   | 1.5                  | 42.9          | 52.8           | 2.9           |
| 64                                   | 62.5                   | 1.6                  | 44.3          | 51.4           | 2.6           |
| 66                                   | 62.6                   | 1.7                  | 45.1          | 50.8           | 2.5           |
| 68                                   | 62.7                   | 1.8                  | 45.8          | 50.1           | 2.4           |
| 70                                   | 62.9                   | 2.0                  | 47.2          | 48.7           | 2.2           |
| 72                                   | 63.1                   | 2.2                  | 48.7          | 47.2           | 2.0           |
| 74                                   | 63.4                   | 2.5                  | 50.8          | 45.1           | 1.7           |
| 76                                   | 63.5                   | 2.6                  | 51.4          | 44.3           | 1.6           |
| 78                                   | 63.8                   | 3.0                  | 53.5          | 42.1           | 1.4           |
| 80                                   | 63.9                   | 3.2                  | 54.1          | 41.4           | 1.3           |

| Egg Size Distribution—U.S. Standards |                              |                        |                            |                      |                       |                      |                          |
|--------------------------------------|------------------------------|------------------------|----------------------------|----------------------|-----------------------|----------------------|--------------------------|
| Age in Weeks                         | Average Egg Weight (lb/case) | Jumbo Over 30 oz/dozen | Extra Large 27–30 oz/dozen | Large 24–27 oz/dozen | Medium 21–24 oz/dozen | Small 18–21 oz/dozen | Peewee Under 18 oz/dozen |
| 22                                   | 39.3                         | 0.0                    | 0.1                        | 5.3                  | 44.7                  | 44.6                 | 5.4                      |
| 24                                   | 42.0                         | 0.0                    | 0.9                        | 19.5                 | 55.9                  | 22.5                 | 1.2                      |
| 26                                   | 43.6                         | 0.0                    | 2.9                        | 32.1                 | 51.9                  | 12.6                 | 0.4                      |
| 28                                   | 44.7                         | 0.1                    | 5.5                        | 41.0                 | 45.7                  | 7.5                  | 0.2                      |
| 30                                   | 45.6                         | 0.2                    | 8.4                        | 48.3                 | 38.8                  | 4.2                  | 0.1                      |
| 32                                   | 46.2                         | 0.2                    | 10.5                       | 52.3                 | 34.1                  | 2.8                  | 0.0                      |
| 34                                   | 46.7                         | 0.3                    | 13.1                       | 55.8                 | 29.1                  | 1.7                  | 0.0                      |
| 36                                   | 47.3                         | 0.4                    | 15.6                       | 58.3                 | 24.7                  | 1.1                  | 0.0                      |
| 38                                   | 47.7                         | 0.5                    | 18.5                       | 60.0                 | 20.3                  | 0.6                  | 0.0                      |
| 40                                   | 47.9                         | 0.7                    | 20.9                       | 58.9                 | 18.9                  | 0.6                  | 0.0                      |
| 42                                   | 48.2                         | 1.0                    | 23.5                       | 58.6                 | 16.5                  | 0.5                  | 0.0                      |
| 44                                   | 48.4                         | 1.2                    | 25.1                       | 57.2                 | 15.9                  | 0.5                  | 0.0                      |
| 46                                   | 48.5                         | 1.3                    | 25.8                       | 57.0                 | 15.4                  | 0.5                  | 0.0                      |
| 48                                   | 48.6                         | 1.7                    | 27.4                       | 55.6                 | 14.9                  | 0.5                  | 0.0                      |
| 50                                   | 48.7                         | 1.9                    | 27.6                       | 55.2                 | 14.9                  | 0.5                  | 0.0                      |
| 52                                   | 48.9                         | 2.2                    | 29.6                       | 53.9                 | 13.9                  | 0.5                  | 0.0                      |
| 54                                   | 49.0                         | 2.5                    | 30.4                       | 52.8                 | 13.9                  | 0.5                  | 0.0                      |
| 56                                   | 49.2                         | 2.9                    | 32.3                       | 51.8                 | 12.5                  | 0.5                  | 0.0                      |
| 58                                   | 49.3                         | 3.4                    | 33.0                       | 50.7                 | 12.5                  | 0.5                  | 0.0                      |
| 60                                   | 49.3                         | 3.8                    | 33.7                       | 49.8                 | 12.2                  | 0.5                  | 0.0                      |
| 62                                   | 49.4                         | 4.0                    | 34.1                       | 49.2                 | 12.2                  | 0.5                  | 0.0                      |
| 64                                   | 49.6                         | 4.4                    | 35.3                       | 48.5                 | 11.4                  | 0.4                  | 0.0                      |
| 66                                   | 49.7                         | 4.6                    | 35.9                       | 48.1                 | 11.0                  | 0.4                  | 0.0                      |
| 68                                   | 49.7                         | 4.8                    | 36.5                       | 47.7                 | 10.7                  | 0.4                  | 0.0                      |
| 70                                   | 50.0                         | 5.2                    | 37.7                       | 46.8                 | 10.0                  | 0.3                  | 0.0                      |
| 72                                   | 50.1                         | 5.6                    | 38.9                       | 45.9                 | 9.3                   | 0.3                  | 0.0                      |
| 74                                   | 50.3                         | 6.3                    | 40.6                       | 44.5                 | 8.3                   | 0.2                  | 0.0                      |
| 76                                   | 50.4                         | 6.6                    | 41.1                       | 44.0                 | 8.0                   | 0.2                  | 0.0                      |
| 78                                   | 50.7                         | 7.4                    | 42.7                       | 42.5                 | 7.2                   | 0.2                  | 0.0                      |
| 80                                   | 50.7                         | 7.7                    | 43.3                       | 41.9                 | 6.9                   | 0.2                  | 0.0                      |



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**[www.hyline.com](http://www.hyline.com)**

**[info@hyline.com](mailto:info@hyline.com)**

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**March 2011**