# LAYER MANAGEMENT GUIDE

LOHMANN

## LOHMANN LSL-CLASSIC

# PRODUCTS OF LOHMANN TIERZUCHT

- **LOHMANN LSL-CLASSIC**
- **LOHMANN BROWN-CLASSIC**
- **LOHMANN LSL-LITE**
- **LOHMANN BROWN-LITE**
- **LOHMANN BROWN-EXTRA**
- **LOHMANN LSL-EXTRA**
- **LOHMANN TRADITION**
- **LOHMANN SANDY**
- **LOHMANN SILVER**

Increasing world wide concentration and growing competition in the poultry industry requires efficient layers to satisfy specific market requirements.

Lohmann Tierzucht, offers a wider range of high quality layer strains "bred in Germany" to meet these demands.

The mainstream products are **LOHMANN LSL-CLASSIC** and **LOHMANN BROWN-CLASSIC**, well known for their efficient production of quality white and brown eggs, respectively.

**LOHMANN LSL-LITE** and **LOHMANN BROWN-LITE** are two new products, designed for markets which prefer smaller eggs and measure efficiency in g feed per egg. For markets requiring more XL-size eggs **LOHMANN LSL-EXTRA** and **LOHMANN BROWN-EXTRA** are the ideal white and brown layers.

**LOHMANN TRADITION**, a new brown egg layer with high early egg weight is being developed mainly for alternative management systems.

**LOHMANN SANDY** is a white feathering layer for the production of cream coloured eggs. The pullet has an outstanding food conversion.

**LOHMANN SILVER** is a predominately white feathering layer for the production of uniform brown eggs with reduced egg weight. Her special advantage is the excellent feathering.

Lohmann LSL hens, too, adapt well to non cage systems and usually do not require beak treatment.

The intensive monitoring programme of all breeding farms and hatchery by our veterinary laboratory assures the highest possible health status of chicks supplied by Lohmann Tierzucht.

# CONTENTS

# INTRODUCTION

## Why should you study this management guide?

Most people who are involved in commercial egg production have seen management guides for different strains of layers before and may think 'if you have seen one, you`ve seen all'. Others take the contents more seriously and expect frequent up-dates to find specific data which apply to the current generation of layers and current management practices. Newcomers in the business may need more detailed explanations than can be presented in this compact format.
We hope that each reader will find some useful information, to confirm proven management practices or to stimulate improvements.

# TOP PERFORMANCE BY SYSTEMATIC SELECTION


In recent decades advanced methods have greatly improved breeding quality.

Due to the development of powerful electronic data processing systems it has become possible to put the theory of selection systematically into practice - thus turning modern quantitative genetics into reality.

Very early on Lohmann Tierzucht used these new techniques and so can offer an extensive range of experience and know-how. A highly qualified team of specialists guarantees prompt utilization of the latest research results. The market's changing demands can be met quickly and effectively.

Moreover, nationally and internationally Lohmann Tierzucht is ranked as first class on questions of poultry health - which is one of the decisive factors for performance and profitability.

Intensive research in our own veterinary lab, besides increasing resistance to disease by genetic means and ensuring the strictest conditions of hygiene, is fundamental to the quality of Lohmann Tierzucht products.

In addition, Lohmann Tierzucht has expertise on all questions of feeds and nutrition.
Practice profits from this extensive expertise in all aspects of poultry management: With Lohmann Tierzucht products eggs are produced in top quality and at competitive costs.

Results of performance comparisons in the field and in independent institutes are the proof.

Lohmann Tierzucht products are often the winners and they are always among the few at the top, world-wide.

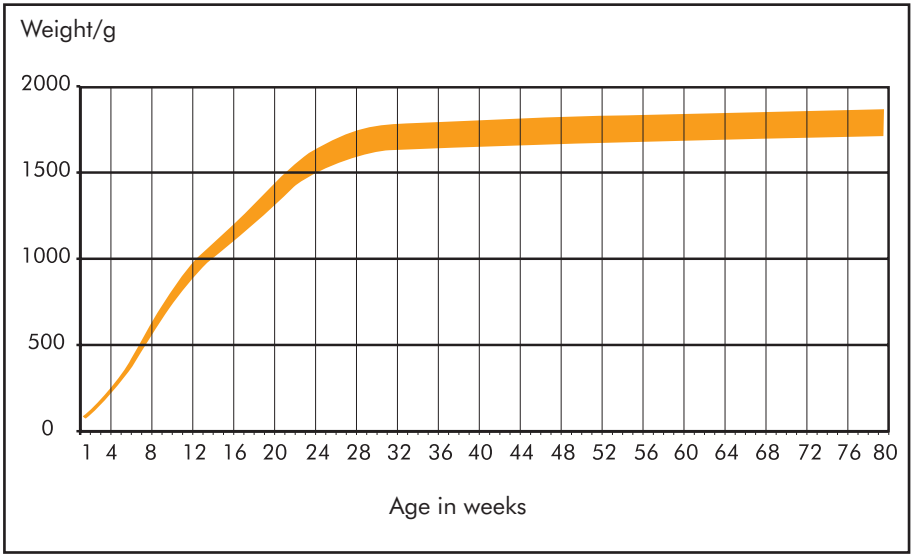
Lohmann Tierzucht - the right partner for progressive, successful poultry management.

## PERFORMANCE DATA

| | | |
|---|---|---|
| **Egg Production** | Age at 50 % production | 140 - 150 days |
| | Peak production | 92 - 95 % |
| | **Eggs per Hen Housed** | |
| | in 12 months of lay | 315 - 320 |
| | in 14 months of lay | 355 - 365 |
| | **Eggs Mass per Hen Housed** | |
| | in 12 months of lay | 19.5 - 20.5 kg |
| | in 14 months of lay | 22.0 - 23.0 kg |
| | **Average Egg Weight** | |
| | in 12 months of lay | 62.0 - 63.0 g |
| | in 14 months of lay | 62.5 - 63.5 g |
| **Egg Caracteristics** | Shell colour | attractive white |
| | Shell breaking strength | 40 Newton |
| **Feed Consumption** | 1st - 20th week | 7.0 - 7.5 kg |
| | Production | 105 - 115 g/day |
| | Feed conversion | 2.0 - 2.1 kg/kg Egg mass |
| **Body Weight** | at 20 weeks | 1.3 - 1.4 kg |
| | at end of production | 1.7 - 1.9 kg |
| **Liveability** | Rearing | 97 - 98 % |
| | Laying period | 94 - 96 % |

# GROWTH CURVE

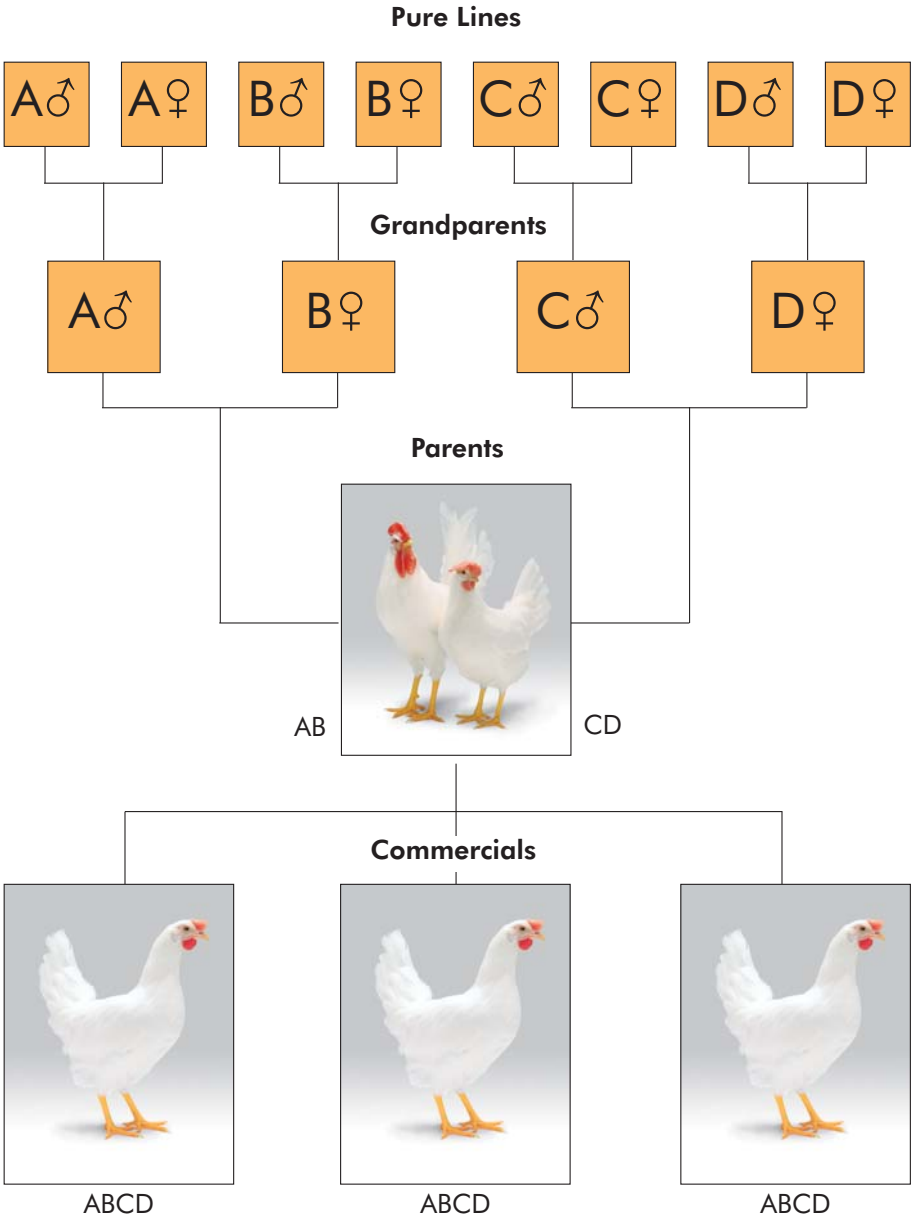
## Weight Development of LOHMANN LSL-CLASSIC Layers




LSL 901

| Age Weeks | Weight Range gram | Age Weeks | Weight Range gram | Age Weeks | Weight Range gram | Age Weeks | Weight Range gram |
|---|---|---|---|---|---|---|---|
| 1 | 72 - 78 | 15 | 1077 - 1167 | 29 | 1622 - 1758 | 54 | 1687 - 1828 |
| 2 | 120 - 130 | 16 | 1120 - 1214 | 30 | 1632 - 1768 | 56 | 1690 - 1830 |
| 3 | 180 - 194 | 17 | 1166 - 1262 | 31 | 1637 - 1773 | 58 | 1692 - 1833 |
| 4 | 247 - 267 | 18 | 1213 - 1315 | 32 | 1642 - 1778 | 60 | 1694 - 1836 |
| 5 | 324 - 350 | 19 | 1269 - 1375 | 34 | 1646 - 1784 | 62 | 1697 - 1838 |
| 6 | 412 - 446 | 20 | 1331 - 1441 | 36 | 1651 - 1789 | 64 | 1699 - 1841 |
| 7 | 509 - 550 | 21 | 1392 - 1508 | 38 | 1656 - 1794 | 66 | 1702 - 1843 |
| 8 | 599 - 649 | 22 | 1440 - 1560 | 40 | 1661 - 1799 | 68 | 1704 - 1846 |
| 9 | 690 - 748 | 23 | 1478 - 1602 | 42 | 1666 - 1804 | 70 | 1706 - 1849 |
| 10 | 777 - 841 | 24 | 1517 - 1643 | 44 | 1670 - 1810 | 72 | 1709 - 1851 |
| 11 | 852 - 922 | 25 | 1546 - 1674 | 46 | 1675 - 1815 | 74 | 1711 - 1854 |
| 12 | 919 - 995 | 26 | 1565 - 1695 | 48 | 1680 - 1820 | 76 | 1714 - 1856 |
| 13 | 976 - 1058 | 27 | 1584 - 1716 | 50 | 1682 - 1823 | 78 | 1716 - 1859 |
| 14 | 1029 - 1115 | 28 | 1603 - 1737 | 52 | 1685 - 1825 | 80 | 1718 - 1862 |

## BREEDING SCHEME



# BODY WEIGHT, FEED CONSUMPTION

### LOHMANN LSL-Classic Pullets

Bodyweight development with standard lighting programme

| Age in Weeks | Body Weight (g) | | | KJ** | Feed Consumption | | Feed* |
|---|---|---|---|---|---|---|---|
| | Average | Range | | Bird/Day | g/Bird/Day | Cumulative | |
| 1 | 75 | 72 | 78 | 120 | 10 | 70 | Grower |
| 2 | 125 | 120 | 130 | 204 | 17 | 189 | |
| 3 | 187 | 180 | 194 | 276 | 23 | 350 | |
| 4 | 257 | 247 | 267 | 331 | 29 | 553 | |
| 5 | 337 | 324 | 350 | 388 | 34 | 791 | |
| 6 | 429 | 412 | 446 | 422 | 37 | 1050 | |
| 7 | 529 | 509 | 550 | 467 | 41 | 1337 | |
| 8 | 624 | 599 | 649 | 513 | 45 | 1652 | |
| 9 | 719 | 690 | 748 | 559 | 49 | 1995 | |
| 10 | 809 | 777 | 841 | 604 | 53 | 2366 | Developer |
| 11 | 887 | 852 | 922 | 638 | 56 | 2758 | |
| 12 | 957 | 919 | 995 | 684 | 60 | 3178 | |
| 13 | 1017 | 976 | 1058 | 730 | 64 | 3626 | |
| 14 | 1072 | 1029 | 1115 | 764 | 67 | 4095 | |
| 15 | 1122 | 1077 | 1167 | 798 | 70 | 4585 | |
| 16 | 1167 | 1120 | 1214 | 832 | 73 | 5096 | |
| 17 | 1214 | 1166 | 1262 | 866 | 76 | 5628 | |
| 18 | 1264 | 1213 | 1315 | 901 | 79 | 6181 | Pre-Lay |
| 19 | 1322 | 1269 | 1375 | 958 | 84 | 6769 | |
| 20 | 1386 | 1331 | 1441 | 1021 | 88 | 7385 | Start Lay |

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* The basis for switching between diet types is the hens' bodyweight development. The correct time for changing the diet is determined not by age but by bodyweight. Chicks and pullets should therefore be weighed at regular intervals.

** 1 Kcal = 4.187 KJ

# NUTRITION

## General

To get the best out of the genetic performance potential of LOHMANN LSL-CLASSIC layers all mash feed with full nutritive value is a must. Such nutrition can best be guaranteed by a complete feed adapted to the performance potential. In our recommendations the essential nutrient levels for each stage of development are listed.

## Feed Consumption

Feed consumption is affected by:

- Body weight
- Performance
- House temperature
  Low temperatures increase the maintenance requirements of the hens, especially in case of poor feathering
- Feed texture
  Coarse texture increases while fine texture decreases feed intake
- Energy level
  The higher the energy level the lower the feed intake and vice versa
- Nutrient imbalances
  The hen will try to compensate for any nutrient deficits by increasing consumption.

## Nutrition and Egg Weight

Within certain limits egg weight can be adapted to farm specific requirements by adjusting rations. The following nutritional factors should be noted:

- Growing
  Feeding for higher body weight at the onset of lay increases the egg weight throughout the whole laying period.
- Feed composition
  - crude protein and methionine
  - linoleic acid
- Feeding technique
  - feed texture
  - feeding time
  - feed level in troughs
  - controlled feeding
  - frequency of feeding

Where possible, adjust house temperature in the opposite direction of desired egg weight and feed intake. By stimulating feed intake egg weight can be increased, and limited by controlled feeding.

Contact your Lohmann Tierzucht specialist for programmes with specific recommendations for nutrition and management to suit your specific requirements.

## Rearing

A balanced and nutritious diet during the rearing stage is essential to enable the chick to develop into a mature pullet. Chicks and pullets should be fed a coarse diet (for particle sizes see table below) of a meal-type consistency. A high proportion of very fine components or a structure that is too coarse lead to a selective feed intake and an unbalanced nutrient supply. A diet with an extremely fine consistency reduces the birds' feed intake and can result in an undersupply of some nutrients.
If pelleting of feed is unavoidable for hygienic reasons the pellets should be crumbled to the recommended consistency.

### Recommended Particle-Size Distribution for Chick Starter, Grower and Layer Feed (MASH)

| Sieve Size (mm) | Passing Part % | Sieve Size Interval (mm) | Part of Interval % |
|---|---|---|---|
| 0.5 mm | 19 | 0 - 0.5 mm | 19 |
| 1.0 mm | 40 | 0.51 - 1 mm | 21 |
| 1.5 mm | 75 | 1.01 - 1.5 mm | 35 |
| 2.0 mm | 90 | 1.51 - 2 mm | 15 |
| 2.5 mm | 100 | > 2 mm | 10* |
| | | | 100 |

* INDIVIDUAL PARTICLES NOT BIGGER THAN
- 3 mm in chick superstarter-/starter diets
- 5 mm in grower and layer diets

During the different growth phases of chicks and pullets qualitatively different feed varieties should be used whose nutrient content meets the birds' changing needs. The diets are matched to the nutrient requirement and weight development at each stage of growth. The use of chick starter is recommended if the standard bodyweight is not reached by feeding grower or if the daily feed intake is expected to be low. The switch to developer should only be made when the standard bodyweight has been reached. A reduced nutrient density during this phase is beneficial for improving eating capacity. The pre-lay diet has about twice the calcium content of developer as well as higher levels of protein and amino acids. Feeding such a diet for about 14 days prior to the planned start of lay is therefore beneficial and, if pullets are moved to the layer facility early, absolutely essential. This diet improves flock uniformity by enabling early maturing birds to obtain sufficient calcium for eggshell production of the first eggs and by providing a better nutrient supply for late maturing birds.

## LOHMANN LSL-CLASSIC Layers
## Recommendations for Nutrient Levels

| Diet type* | | Starter** | Grower | Developer | Pre-Layer | Start-Lay |
|---|---|---|---|---|---|---|
| **Nutrient** | | **1-3 weeks** | **1-8 weeks** | **9-16 weeks** | **week 17 5% prod.** | **5% prod.- ~ week 28** |
| Metabol. Energy | kcal | 2900 | 2750 - 2800 | 2750 - 2800 | 2750 - 2800 | 2800 |
| minimum | MJ | 12.0 | 11.4 | 11.4 | 11.4 | 11.6 |
| Crude Protein | % | 21.0 | 18.5 | 14.5 | 17.5 | 18.0 |
| Methionine | % | 0.48 | 0.40 | 0.34 | 0.36 | 0.40 |
| Dig. Methionine | % | 0.39 | 0.33 | 0.28 | 0.29 | 0.33 |
| Meth./Cystine | % | 0.83 | 0.70 | 0.60 | 0.68 | 0.73 |
| Dig. M/C | % | 0.68 | 0.57 | 0.50 | 0.56 | 0.60 |
| Lysine | % | 1.20 | 1.00 | 0.65 | 0.85 | 0.83 |
| Dig. Lysine | % | 0.98 | 0.82 | 0.53 | 0.70 | 0.68 |
| Valin | % | 0.89 | 0.75 | 0.53 | 0.64 | 0.67 |
| Dig. Valin | % | 0.76 | 0.64 | 0.46 | 0.55 | 0.58 |
| Tryptophan | % | 0.23 | 0.21 | 0.16 | 0.20 | 0.20 |
| Dig. Tryptophan | % | 0.19 | 0.17 | 0.13 | 0.16 | 0.16 |
| Threonine | % | 0.80 | 0.70 | 0.50 | 0.60 | 0.59 |
| Dig. Threonine | % | 0.65 | 0.57 | 0.40 | 0.49 | 0.48 |
| Isoleucine | % | 0.83 | 0.75 | 0.60 | 0.74 | 0.66 |
| Dig. Isoleucine | % | 0.68 | 0.62 | 0.50 | 0.61 | 0.55 |
| Calcium | % | 1.05 | 1.00 | 0.90 | 2.00 | 3.70 |
| Phosphor, total | % | 0.75 | 0.70 | 0.58 | 0.65 | 0.60 |
| Phosphor, avail. | % | 0.48 | 0.45 | 0.37 | 0.45 | 0.45 |
| Sodium | % | 0.18 | 0.17 | 0.16 | 0.16 | 0.16 |
| Chlorine | % | 0.20 | 0.19 | 0.16 | 0.16 | 0.16 |
| Linoleic Acid | % | 2.00 | 1.40 | 1.00 | 1.00 | 2.00 |

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* The basis for switching between diet types is the hens' bodyweight development. The correct time for changing the diet is determined not by age but by bodyweight. Chicks and pullets should therefore be weighed at regular intervals.

** Chick starter should be fed if the standard bodyweight is not reached by feeding chick grower or if the daily feed intake is expected to be low.

A "Prelay" diet should not be offered too early and used only for a short time. The decision for its application has to be made at the time when weekly growth per pullet changes from a declining to an increasing tendency, caused by development of the laying tract. The "Prelay" diet will safeguard the required nutrient supply of early maturing pullets in the flock without inhibiting feed consumption of later maturing birds. After reaching 4 - 5 % production a change to the first layer diet, the "Start-Lay" feed is essential.

## Laying Period

Layer starter is an energy- and nutrient-rich feed with a coarse consistency and a calcium content of 3.7 %. This diet, intended for the period of increasing egg production and rising feed intake, is fed until the time of peak lay (at about 28 weeks of age). At this time all hens in a healthy flocks are laying. At 28 weeks a phase-feeding programme should be introduced. The basis for the feed formulation in each phase is the nutrient requirement and actual feed consumption.

The diet for phase 1 is designed to cover the requirement for maximum egg mass (over 58 g daily egg mass / hen). It is similar to layer starter but has a higher calcium content.

The recommended nutrient allowances shown in the tables (phase 1 – 3) assume a dietary energy concentration of 11.4 MJ/kg (2720 kcal) metabolisable energy, a house temperature of 22 °C and good plumage.

Under these conditions the daily feed consumption of LOHMANN LSL-CLASSIC is expected to be 105 – 115 g/day. The feed formulations for phases 2 – 3 cater for the reduced requirement for organic nutrients and the increasing requirement for calcium as the hens grow. **The time for switching diets is determined more by the level of production and the need for calcium rather than by age.**

Every 10 weeks throughout the laying period the composition of the diet should be adapted to the level of production and the hens' nutrient requirement. Major changes in the raw material composition of the various phase diets or marked changes in feed consistency should be avoided.

## Supplements

Supplements ensure the necessary supply of essential vitamins, trace elements and substances such as anti-oxidants or carotenoids.

Suitable supplementation can compensate for the varying contents of raw materials and safeguard the supply of all necessary nutrients.

## Recommended Nutrient Levels per kg of Feed for different daily Feed Consumption in Phase 1 (29 to approx. 45 week ≙ above 58.6 g Egg Mass/Hen/Day)

| Nutrient | | Require-ment g/Hen/Day | Daily Feed Consumption | | | |
|---|---|---|---|---|---|---|
| | | | 105 g | 110 g | 115 g | 120 g |
| Protein | % | 18.50 | 17.62 % | 16.82 % | 16.09 % | 15.42 % |
| Calcium | % | 4.10 | 3.90 % | 3.73 % | 3.57 % | 3.42 % |
| Total Phosphorus* | % | 0.60 | 0.57 % | 0.55 % | 0.52 % | 0.50 % |
| Av. Phosphorus | % | 0.42 | 0.40 % | 0.38 % | 0.37 % | 0.35 % |
| Sodium | % | 0.17 | 0.16 % | 0.15 % | 0.15 % | 0.14 % |
| Chloride | % | 0.17 | 0.16 % | 0.15 % | 0.15 % | 0.14 % |
| Lysine | % | 0.87 | 0.83 % | 0.79 % | 0.76 % | 0.73 % |
| Dig. Lysine | % | 0.71 | 0.68 % | 0.65 % | 0.62 % | 0.59 % |
| Methionine | % | 0.44 | 0.42 % | 0.40 % | 0.38 % | 0.37 % |
| Dig. Methionine | % | 0.36 | 0.34 % | 0.33 % | 0.31 % | 0.30 % |
| Meth./Cyst. | % | 0.80 | 0.76 % | 0.73 % | 0.70 % | 0.67 % |
| Dig. M/C | % | 0.66 | 0.63 % | 0.60 % | 0.57 % | 0.55 % |
| Valin | % | 0.69 | 0.66 % | 0.63 % | 0.60 % | 0.58 % |
| Dig. Valin | % | 0.59 | 0.56 % | 0.54 % | 0.51 % | 0.49 % |
| Tryptophan | % | 0.21 | 0.20 % | 0.19 % | 0.18 % | 0.18 % |
| Dig. Tryptophan | % | 0.17 | 0.16 % | 0.15 % | 0.15 % | 0.14 % |
| Threonin | % | 0.64 | 0.61 % | 0.58 % | 0.56 % | 0.53 % |
| Dig. Threonin | % | 0.52 | 0.50 % | 0.47 % | 0.45 % | 0.43 % |
| Isoleucine | % | 0.66 | 0.63 % | 0.60 % | 0.57 % | 0.55 % |
| Dig. Isoleucine | % | 0.55 | 0.52 % | 0.50 % | 0.48 % | 0.46 % |
| Linoleic Acid | % | 2.00 | 1.90 % | 1.82 % | 1.74 % | 1.67 % |

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* without Phytase

## Phase 2 (approx. week 46 to 65 ≅ above 57.0 g Egg Mass/Hen/Day)

| Nutrient | | Requirement g/Hen/Day | Daily Feed Consumption | | | |
|---|---|---|---|---|---|---|
| | | | 105 g | 110 g | 115 g | 120 g |
| Protein | % | 18.00 | 17.14 % | 16.36 % | 15.65 % | 15.00 % |
| Calcium | % | 4.40 | 4.19 % | 4.00 % | 3.83 % | 3.67 % |
| Total Phosphorus* | % | 0.56 | 0.53 % | 0.51 % | 0.49 % | 0.47 % |
| Av. Phosphorus | % | 0.40 | 0.38 % | 0.36 % | 0.35 % | 0.33 % |
| Sodium | % | 0.17 | 0.16 % | 0.15 % | 0.15 % | 0.14 % |
| Chloride | % | 0.17 | 0.16 % | 0.15 % | 0.15 % | 0.14 % |
| Lysine | % | 0.83 | 0.79 % | 0.75 % | 0.72 % | 0.69 % |
| Dig. Lysine | % | 0.68 | 0.65 % | 0.62 % | 0.59 % | 0.57 % |
| Methionine | % | 0.40 | 0.38 % | 0.36 % | 0.35 % | 0.33 % |
| Dig. Methionine | % | 0.33 | 0.31 % | 0.30 % | 0.29 % | 0.27 % |
| Meth./Cyst. | % | 0.74 | 0.70 % | 0.67 % | 0.64 % | 0.62 % |
| Dig. M/C | % | 0.61 | 0.58 % | 0.55 % | 0.53 % | 0.51 % |
| Valin | % | 0.68 | 0.65 % | 0.62 % | 0.59 % | 0.57 % |
| Dig. Valin | % | 0.58 | 0.56 % | 0.53 % | 0.51 % | 0.49 % |
| Tryptophan | % | 0.20 | 0.19 % | 0.18 % | 0.17 % | 0.17 % |
| Dig. Tryptophan | % | 0.16 | 0.15 % | 0.15 % | 0.14 % | 0.14 % |
| Threonin | % | 0.58 | 0.55 % | 0.53 % | 0.50 % | 0.48 % |
| Dig. Threonin | % | 0.47 | 0.45 % | 0.43 % | 0.41 % | 0.39 % |
| Isoleucine | % | 0.65 | 0.62 % | 0.59 % | 0.57 % | 0.54 % |
| Dig. Isoleucine | % | 0.54 | 0.51 % | 0.49 % | 0.47 % | 0.45 % |
| Linoleic Acid | % | 1.50 | 1.43 % | 1.36 % | 1.30 % | 1.25 % |

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* without Phytase

## Phase 3 (after week 65)

| Nutrient | | Requirement g/Hen/Day | Daily Feed Consumption | | | |
|---|---|---|---|---|---|---|
| | | | 105 g | 110 g | 115 g | 120 g |
| Protein | % | 17.50 | 16.67 % | 15.91 % | 15.22 % | 14.58 % |
| Calcium | % | 4.50 | 4.29 % | 4.09 % | 3.91 % | 3.75 % |
| Total Phosphorus* | % | 0.47 | 0.45 % | 0.43 % | 0.41 % | 0.39 % |
| Av. Phosphorus | % | 0.35 | 0.33 % | 0.32 % | 0.30 % | 0.29 % |
| Sodium | % | 0.17 | 0.16 % | 0.15 % | 0.15 % | 0.14 % |
| Chloride | % | 0.17 | 0.16 % | 0.15 % | 0.15 % | 0.14 % |
| Lysine | % | 0.78 | 0.74 % | 0.71 % | 0.68 % | 0.65 % |
| Dig. Lysine | % | 0.64 | 0.61 % | 0.58 % | 0.56 % | 0.53 % |
| Methionine | % | 0.36 | 0.34 % | 0.33 % | 0.31 % | 0.30 % |
| Dig. Methionine | % | 0.30 | 0.28 % | 0.27 % | 0.26 % | 0.25 % |
| Meth./Cyst. | % | 0.67 | 0.64 % | 0.61 % | 0.58 % | 0.56 % |
| Dig. M/C | % | 0.55 | 0.52 % | 0.50 % | 0.48 % | 0.46 % |
| Valin | % | 0.64 | 0.61 % | 0.58 % | 0.56 % | 0.53 % |
| Dig. Valin | % | 0.55 | 0.52 % | 0.50 % | 0.48 % | 0.46 % |
| Tryptophan | % | 0.19 | 0.18 % | 0.17 % | 0.17 % | 0.16 % |
| Dig. Tryptophan | % | 0.15 | 0.15 % | 0.14 % | 0.13 % | 0.13 % |
| Threonin | % | 0.55 | 0.52 % | 0.50 % | 0.48 % | 0.46 % |
| Dig. Threonin | % | 0.45 | 0.42 % | 0.41 % | 0.39 % | 0.37 % |
| Isoleucine | % | 0.61 | 0.58 % | 0.55 % | 0.53 % | 0.51 % |
| Dig. Isoleucine | % | 0.51 | 0.48 % | 0.46 % | 0.44 % | 0.42 % |
| Linoleic Acid | % | 1.30 | 1.24 % | 1.18 % | 1.13 % | 1.08 % |

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* without Phytase

## Continuous Supply of Fine and Coarse Limestone Recommended Relation in Feed

| Feedtype | Fine Limestone | Coarse Limestone* |
|---|---|---|
| Start-Lay | 35 % | 65 % |
| Layer Phase 1 | 30 % | 70 % |
| Layer Phase 2 | 25 % | 75 % |
| Layer Phase 3 | 15 % | 85 % |

* can be partly replaced by oystershells

## Recommended Micro-Nutrient Specification

| Supplements per kg Feed | | Starter/ Grower | Deve- loper | Pre-Layer/ Layer |
|---|---|---|---|---|
| Vitamin A | I.U. | 12000 | 12000 | 10000 |
| Vitamin $D_3$ | I.U. | 2000 | 2000 | 2500 |
| Vitamin E | mg | 20 - 30* | 20 - 30* | 15 - 30* |
| Vitamin $K_3$ | mg | 3** | 3** | 3** |
| Vitamin $B_1$ | mg | 1 | 1 | 1 |
| Vitamin $B_2$ | mg | 6 | 6 | 4 |
| Vitamin $B_6$ | mg | 3 | 3 | 3 |
| Vitamin $B_{12}$ | mcg | 15 | 15 | 15 |
| Pantothenic Acid | mg | 8 | 8 | 8 |
| Nicotinic Acid | mg | 30 | 30 | 30 |
| Folic Acid | mg | 1.0 | 1.0 | 0.5 |
| Biotin | mcg | 50 | 50 | 25 |
| Cholin | mg | 300 | 300 | 400 |
| Antioxydant | mg | 100 - 150* | 100 - 150* | 100 - 150* |
| Coccidiostat | | as required | as required | - |
| Manganese | mg | 100 | 100 | 100 |
| Zinc | mg | 60 | 60 | 60 |
| Iron | mg | 25 | 25 | 25 |
| Copper | mg | 5 | 5 | 5 |
| Cobalt | mg | 0.1 | 0.1 | 0.1 |
| Iodine | mg | 0.5 | 0.5 | 0.5 |
| Selenium | mg | 0.2 | 0.2 | 0.2 |

* according to fat addition
** double in case of heat treated feed

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# GENERAL RECOMMENDATIONS

## Daily Control

Check at least once a day:

- health status
- ventilation
- lighting
- temperature
- feed and water consumption
- mortality

When assessing the state of health, do not just go by the general impression and mortality rate, but also take note of feed and water consumption and the condition of droppings.

## Water Supply

Clean water is just as important as good feed for top performance. If you are using your own water supply, have the quality checked regularly. Excessive salt levels in drinking-water can cause persistent damage to shell quality.

## Egg Quality

LOHMANN LSL-CLASSIC layers produce eggs of excellent quality. To preserve the quality the following points should be observed:

- collect eggs at least once a day
- store eggs at temperatures between 5° and 10° C with a relative humidity between 80 - 85 %.

Storing at higher temperatures and lower humidity leads to rapid loss of weight and impairs the quality of the egg white due to increased gas exchange.

# HOUSING CHICKS

## Before Arrival of Chicks

1. Before bringing in the chicks check that everything is in good working order.
2. Warm up the house in good time. In summer start heating at least 24 hours and in winter at least 48 hours before the chicks arrive.
3. Distribute feed and water. The water should have room temperature by the time the chicks arrive.
4. In the case of cage rearing adjust the cage floors and feeding grids according to the manufacturer's instructions.

## On Arrival of Chicks

1. Unload all chick boxes and distribute them in the house. Remove lids and put them loosely on top of the boxes.
2. Quickly place the chicks near feeders and drinkers. For cage rearing distribute the chicks evenly among the cages starting at the far end of the house.
3. After placing the chicks, again check the working order of equipment and the temperature.
4. After a few hours check whether the chicks have settled down well. The chicks' behaviour is the best indicator of their well-being:
   - If the chicks are evenly spread out and moving freely, temperature and ventilation are all right.
   - If the chicks are crowding together or avoiding certain areas within the house, temperature is too low or there is a draught.
   - If the chicks are lying about on the floor with outspread wings and gasping for air, temperature is too high.

**At first signs that the chicks are not feeling well determine the reason, correct the situation and check more frequently.**

# FLOOR MANAGEMENT

Birds kept on floor during production must also be reared on floor.
An important aspect of floor rearing is to develop immunity against coccidiosis. We recommend vaccination as the most reliable method to achieve this goal. Never use coccidiostats in the feed when pullets are vaccinated.

## Stocking Density

The optimal bird density/$m^2$ depends on management conditions and to which extent climate can be controlled. 6 - 8 birds/$m^2$ can be taken as a general guide. Take note of deviating regulations for stocking density and declaration of eggs.

## Grit

Feeding grit is not absolutely necessary but can be recommended when the rations are supplemented by grain.

| Guide | |
|---|---|
| Week 1 - 2 | once a week 1 g/bird (size 1 - 2 mm) |
| Week 3 - 8 | once a week 2 g/bird (size 3 - 4 mm) |
| From week 9 | once a month 3 g/bird (size 4 - 6 mm) |

## Litter

Softwood shavings or straw make suitable litter. Use shavings from untreated wood only in order to avoid poisonings and residues in the egg. Provide sufficient ventilation to ensure good litter condition and remove wet litter, if necessary.

## Nests and Egg Collecting

Quality of nests is also a factor which affects egg quality. Regularly renew the litter in litter-type nests and keep them clean. Provide individual nests at a rate of one nest for 4 hens. Collect floor eggs frequently to keep their rate as low as possible. In addition to sufficient nesting space in family type nests, the following factors are important for a low rate of floor eggs:

- clean, dry litter or soft nest lining
- easy access
- even distribution of the nests within the shed
- only one type of nest in the shed.

For optimum egg quality, rollaway nests in combination with slats are better than litter-type nests or family type nests.

### Equipment for Rearing

| | Age in Weeks | |
|---|---|---|
| Chick founts | 1 | 1 fount (4 - 5 l) for 100 chicks |
| Round drinkers | to 20 | 1 drinker (Ø 46 cm) for 125 birds |
| Linear drinkers | to 20 | 1 running m for 100 birds |
| Nipple drinkers | to 20 | 6 - 8 birds per nipple |
| Chick feeding trays | 1 - 2 | 1 tray for 60 chicks |
| Cut off chick cartons | 1 - 2 | 1 carton for 100 chicks |
| Round feeders | 3 - 10<br>11 - 20 | 2 feeders (Ø 40 cm) for 100 birds<br>3 feeders (Ø 40 cm) for 100 birds |
| Chain feeders | 3 - 10<br>11 - 20 | 2,5 - 3,5 lin. m for 100 birds<br>4,5 lin. m for 100 birds |

### Equipment for Production

| | |
|---|---|
| Round drinkers | 1 drinker (Ø 46 cm) for 125 birds |
| Linear drinkers | 1 running m for 80 - 100 birds |
| Nipple drinkers | 4 - 6 birds per nipple |
| Round feeders | 4 feeders (Ø 40 cm) for 100 birds |
| Single nests | 1 nest (26 x 30 cm) for 4 birds |
| Chain feeders | 5 lin. m for 100 birds |

**Further details in the Lohmann Management guide for floor/free range housing.**

# ENVIRONMENT

Environmental conditions affect the well-being and performance of the birds. Important environmental factors are temperature, humidity and level of toxic gases in the air. The optimal temperature depends on the age of the birds. The following table is a guide to the correct temperature at bird level. The birds' behaviour is the best indicator for correct temperature!

Always reduce temperature gradually, and avoid sudden changes. The best temperature for optimal feed conversion in the production period is from 22° - 24° C.

If the ventilation system is used to regulate temperature, take care that the necessary fresh air is supplied.

| Age | Temperature °C | Age | Temperature °C |
|---|---|---|---|
| day 1 - 2 * | 36-35 | week 3 | 27-26 |
| day 3 - 4 | 34-33 | week 4 | 24-22 |
| day 5 - 7 | 32-31 | week 5 | 20-18 |
| week 2 | 29-28 | week 6 | 18-20 |

* Body temperatures of 40-41 C° are the optimum for chicks

The air quality should meet the following minimum requirements:

| | | | | | |
|---|---|---|---|---|---|
| $O_2$ | over | 16 % | $NH_3$ | under | 20 ppm |
| $CO_2$ | under | 0,3 % | $H_2S$ | under | 5 ppm |
| CO | under | 40 ppm | | | |

The relative humidity inside the house should be 60 - 70 %.

# LIGHTING

## General

The lighting programme controls onset of lay and affects the performance during the production period. Within certain limits, performance can be adapted to farm specific requirements by adjusting the lighting scheme.

Easiest to follow are the lighting programmes in closed houses. In this case the hours of light and light intensity can be adjusted to changing needs.

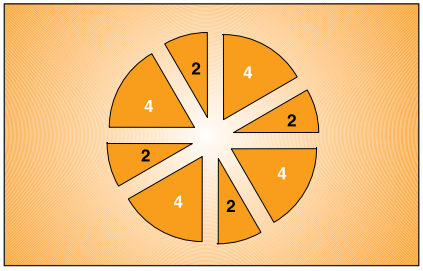
Rearing in an open house and then changing to a closed house for the production period should be avoided at all costs. Sudden drop in light intensity can depress performance.

Rearing in a closed house and then moving to an open house for production is possible - but needs great care and attention. If the period of natural day-light is long and light intensity is high at the time of re-housing, it is difficult to control point of lay. Moreover, moving the birds to a brighter production house can lead to increased nervousness. To minimize the stress of moving from light-controlled rearing to an uncontrolled laying house, keep light intensity and day length during rearing closer to conditions in the laying house and move the pullets as late as possible.

## Intermittent Lighting Programme in Rearing for Day Old Chicks

When the Day Old Chicks arrive on the farm, they have been intensively handled in the hatchery and often had a long transport to their final destination. Common practice is to give them in the first 2 or 3 days after arrival, 24 hours light to help them to recover and to provide those chicks enough time to eat and to drink. In practice it can be observed that after arrival and housing some chicks continue to sleep, others are looking for feed and water. The activity of the flock will always be irregular. Especially in this phase, poultrymen have difficulties interpreting the chicks behaviour and their condition.
There is a practically proved principal in splitting the day into phases of resting and activity using a special designed intermittent lighting programme. The target is to synchronise the chicks' activities. The farmer gets a better impression on the flocks condition, the birds are pushed by the groups behaviour to search for water and feed.

Therefore Lohmann Tierzucht advise to give chicks a rest after they arrive at the rearing farm and then start with periodically four hours of light and two hours of darkness.




**Lighting programme after arrival**

4 hours light
2 hours darkness
4 hours light
2 hours darkness
4 hours light
2 hours darkness
4 hours light
2 hours darkness

This programme can be used for up to 7 or 10 days after arrival. Then switch back to the regular step down lighting programme.

The usage of the following lighting programme brings about advantages as follows:

- The chicks are resting or sleeping at the same time. That means that the behaviour of the chicks will be synchronised.
- The weak chicks will be stimulated by stronger ones to move as well as to eat and drink.
- The behaviour of the flock is more uniform and the judgment of the birds is easier.
- The mortality will decrease.

## Lighting Programme for Closed Houses

In closed houses the basic principles of lighting programme for layers are:

- never increase hours of light during the growing period
- never decrease hours of light during the production period

To what degree lighting hours are reduced during the growing period, and the time when stimulation is started by increasing the lighting hours, are means by which performance can be adapted to farm specific requirements.

The lighting programme is designed for long utilization and aims at high egg weight. It should be combined with feed programme on page 9. Depending on weight development of the pullets according to page 6 it may be accompanied by controlled feeding between 10 - 15 weeks of age.

**Recommendations for intermittent lighting programmes are available on request.**

### Lighting Programme for Windowless Houses (LOHMANN LSL-CLASSIC)

| Age in Weeks | Light in Hours | Light Intensity | |
|---|---|---|---|
| | Standard | W/m² | Lux |
| Day 1 - 2 | 24 | 3 - 4 | 20 - 40 |
| Day 3 - 6 | 16 | 2 | 20 - 30 |
| 2 | 14 | 2 | 10 - 20 |
| 3 | 13 | 1 | 10 - 20 |
| 4 | 12 | 1 | 4 - 6 |
| 5 | 11 | 1 | 4 - 6 |
| 6 | 10 | 1 | 4 - 6 |
| 7 | 9 | 1 | 4 - 6 |
| 8 | 8 | 1 | 4 - 6 |
| 9 | 8 | 1 | 4 - 6 |
| 10 | 8 | 1 | 4 - 6 |
| 11 | 8 | 1 | 4 - 6 |
| 12 | 8 | 1 | 4 - 6 |
| 13 | 8 | 1 | 4 - 6 |
| 14 | 8 | 1 | 4 - 6 |
| 15 | 8 | 1 | 4 - 6 |
| 16 | 8 | 1 | 4 - 6 |
| 17 | 8 | 1 | 4 - 6 |
| 18 | 8 | 3 | 10 - 15 |
| 19 | 9 | 3 | 10 - 15 |
| 20 | 10 | 3 | 10 - 15 |
| 21 | 11 | 3 | 10 - 15 |
| 22 | 12 | 3 | 10 - 15 |
| 23 | 13 | 3 | 10 - 15 |
| 24 | 14 | 3 | 10 - 15 |
| 25* | 14 | 3 | 10 - 15 |

* until the end of produktion

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## Lighting Programme for Open Houses

If natural light enters the building throughout the day or if the hens have free access to covered outdoor areas or runs, the effect of the natural daylight must be considered when designing lighting programmes. Bear in mind that in central Europe the natural daylength increases in the course of the calendar year to about 17 hours until late June and then shortens to about 8 hours until late December.

The principle for windowless houses **"Do not increase the light period during rearing and do not reduce the light period during production"** also applies to "open" housing, but it is essential to consider the natural daylength.

If flocks are moved to production housing with windows that cannot be darkened or into which light enters through ventilation shafts (stray light), or if the hens have free access to covered outdoor areas or runs, the lighting programme must be adjusted to the natural daylength at the time of rehousing. We distinguish between two variants:

1. Production starts as the natural daylength decreases

2. Production starts as the natural daylength increases

In both variant 1 and variant 2 the lighting programme at 17 weeks of age should be set to a light period of at least 10 hours, taking the natural daylength into account, and increased by one hour every week to 14 hours at 21 weeks of age. **Never switch on the artificial light before 04.00 hours (CE summer time)**. During the spring months the lighting programme is affected by the increase in the natural daylength and gradually extended to about 17 hours. When the natural daylength begins to decrease from July, the 17-hour light period should be kept constant until the end of the production period. This can be accomplished very simply as follows:

- 04.00* hours: lights on - dimmer switch off at ≥ 50-60 Lux.
- Dimmer switch on at ≤ 50-60 Lux - 21.00* hours lights off.

* Central European summer time

These times can and should be varied depending on the condition of the flocks, the start of lay (production, egg size) and the facilities in the building.

If for operational reasons a different diurnal rhythm from the one described above is applied, it should not differ too much from the dawn/dusk times stated above, having regard to the diurnal rhythm of the hens.

If the birds are driven indoors before the end of the natural day and if the building can be darkened completely, the lighting programme for windowless laying houses should be applied:
The times for darkening the room or opening the windows are determined by the lighting programme. It is important to follow the correct sequence: in the evening close the windows first, then switch off the light; in the morning switch on the light first, then open the windows.

# HYGIENE

## General Recommendations

1. Set up the farm at a safe distance from other poultry houses and fence in.
2. Keep birds of only one age group on the farm.
3. Keep no other poultry on the farm.
4. Allow no visitors to enter the farm.
5. Wear only the farm's own protective clothing within the farm area.
6. Provide the farm's own protective clothing for veterinarians, service and maintenance workers, and consultants.
7. Disinfect boots before entering the houses.
8. Use bulk feed if possible. Do not allow the truck driver to enter the houses.
9. Safeguard the houses against wild birds and vermin. Keep rats and mice under constant control.
10. Dispose of dead birds hygienically. Follow local laws and regulations.

# PERFORMANCE GOALS

## LOHMANN LSL-CLASSIC Layers

| Age in Weeks | Egg No. per H.H. | Rate of Lay in % | | Egg Weight (g) | | Egg Mass g/H.D. | kg/H.H. |
|---|---|---|---|---|---|---|---|
| | cumu-lative | per H.H. | per H.D. | in the Week | cumu-lative | in the Week | cumu-lative |
| 20 | 1.0 | 15.0 | 15.0 | 42.7 | 42.7 | 6.4 | 0.04 |
| 21 | 4.3 | 47.0 | 47.0 | 46.6 | 45.7 | 21.9 | 0.20 |
| 22 | 9.2 | 69.0 | 69.1 | 49.1 | 47.5 | 33.9 | 0.44 |
| 23 | 14.8 | 81.0 | 81.2 | 52.1 | 49.2 | 42.3 | 0.73 |
| 24 | 20.9 | 87.0 | 87.3 | 54.2 | 50.7 | 47.3 | 1.06 |
| 25 | 27.3 | 90.5 | 91.0 | 56.0 | 51.9 | 51.0 | 1.42 |
| 26 | 33.7 | 92.5 | 93.1 | 57.5 | 53.0 | 53.5 | 1.79 |
| 27 | 40.3 | 93.5 | 94.2 | 58.4 | 53.9 | 55.0 | 2.17 |
| 28 | 46.9 | 93.8 | 94.6 | 59.1 | 54.6 | 55.9 | 2.56 |
| 29 | 53.4 | 93.9 | 94.8 | 59.6 | 55.2 | 56.5 | 2.95 |
| 30 | 60.0 | 94.0 | 95.0 | 60.0 | 55.8 | 57.0 | 3.35 |
| 31 | 66.6 | 94.1 | 95.1 | 60.4 | 56.2 | 57.5 | 3.74 |
| 32 | 73.2 | 94.0 | 95.1 | 60.8 | 56.6 | 57.9 | 4.14 |
| 33 | 79.7 | 93.9 | 95.1 | 61.2 | 57.0 | 58.2 | 4.55 |
| 34 | 86.3 | 93.8 | 95.1 | 61.6 | 57.4 | 58.6 | 4.95 |
| 35 | 92.9 | 93.7 | 95.1 | 61.9 | 57.7 | 58.9 | 5.36 |
| 36 | 99.4 | 93.5 | 95.0 | 62.2 | 58.0 | 59.1 | 5.76 |
| 37 | 106.0 | 93.3 | 94.9 | 62.5 | 58.3 | 59.3 | 6.17 |
| 38 | 112.5 | 93.1 | 94.8 | 62.7 | 58.5 | 59.4 | 6.58 |
| 39 | 119.0 | 92.9 | 94.7 | 62.9 | 58.7 | 59.6 | 6.99 |
| 40 | 125.5 | 92.7 | 94.6 | 63.1 | 59.0 | 59.7 | 7.40 |
| 41 | 131.9 | 92.5 | 94.5 | 63.2 | 59.2 | 59.7 | 7.81 |
| 42 | 138.4 | 92.3 | 94.4 | 63.3 | 59.4 | 59.7 | 8.22 |
| 43 | 144.8 | 92.0 | 94.2 | 63.4 | 59.6 | 59.7 | 8.63 |
| 44 | 151.3 | 91.7 | 94.0 | 63.5 | 59.7 | 59.7 | 9.03 |
| 45 | 157.7 | 91.4 | 93.7 | 63.6 | 59.9 | 59.6 | 9.44 |
| 46 | 164.0 | 91.1 | 93.5 | 63.7 | 60.0 | 59.6 | 9.85 |
| 47 | 170.4 | 90.8 | 93.3 | 63.8 | 60.2 | 59.5 | 10.25 |
| 48 | 176.7 | 90.5 | 93.1 | 63.9 | 60.3 | 59.5 | 10.66 |
| 49 | 183.0 | 90.1 | 92.8 | 64.0 | 60.4 | 59.4 | 11.06 |

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## LOHMANN LSL-CLASSIC Layers

| Age in Weeks | Egg No. per H.H. | Rate of Lay in % | | Egg Weight (g) | | Egg Mass g/H.D. | Egg Mass kg/H.H. |
|---|---|---|---|---|---|---|---|
| | cumu-lative | je H.H. | je H.D. | in the Week | cumu-lative | in the Week | cumu-lative |
| 50 | 189.3 | 89.7 | 92.5 | 64.1 | 60.6 | 59.3 | 11.46 |
| 51 | 195.6 | 89.3 | 92.2 | 64.2 | 60.7 | 59.2 | 11.86 |
| 52 | 201.8 | 88.9 | 91.8 | 64.3 | 60.8 | 59.1 | 12.26 |
| 53 | 208.0 | 88.5 | 91.5 | 64.4 | 60.9 | 58.9 | 12.66 |
| 54 | 214.1 | 88.0 | 91.1 | 64.5 | 61.0 | 58.8 | 13.06 |
| 55 | 220.3 | 87.5 | 90.7 | 64.6 | 61.1 | 58.6 | 13.46 |
| 56 | 226.3 | 87.0 | 90.2 | 64.7 | 61.2 | 58.4 | 13.85 |
| 57 | 232.4 | 86.5 | 89.8 | 64.8 | 61.3 | 58.2 | 14.24 |
| 58 | 238.4 | 86.0 | 89.4 | 64.9 | 61.4 | 58.0 | 14.63 |
| 59 | 244.4 | 85.5 | 89.0 | 65.0 | 61.5 | 57.8 | 15.02 |
| 60 | 250.4 | 84.9 | 88.4 | 65.1 | 61.5 | 57.6 | 15.41 |
| 61 | 256.3 | 84.3 | 87.9 | 65.2 | 61.6 | 57.3 | 15.79 |
| 62 | 262.1 | 83.7 | 87.4 | 65.3 | 61.7 | 57.1 | 16.18 |
| 63 | 267.9 | 83.1 | 86.8 | 65.4 | 61.8 | 56.8 | 16.56 |
| 64 | 273.7 | 82.5 | 86.3 | 65.5 | 61.9 | 56.5 | 16.93 |
| 65 | 279.4 | 81.8 | 85.7 | 65.6 | 61.9 | 56.2 | 17.31 |
| 66 | 285.1 | 81.1 | 85.0 | 65.7 | 62.0 | 55.9 | 17.68 |
| 67 | 290.7 | 80.4 | 84.4 | 65.8 | 62.1 | 55.5 | 18.05 |
| 68 | 296.3 | 79.7 | 83.7 | 65.9 | 62.2 | 55.2 | 18.42 |
| 69 | 301.8 | 79.0 | 83.1 | 66.0 | 62.2 | 54.8 | 18.79 |
| 70 | 307.3 | 78.2 | 82.3 | 66.1 | 62.3 | 54.4 | 19.15 |
| 71 | 312.7 | 77.4 | 81.6 | 66.2 | 62.4 | 54.0 | 19.51 |
| 72 | 318.1 | 76.6 | 80.8 | 66.3 | 62.4 | 53.6 | 19.86 |
| 73 | 323.4 | 75.8 | 80.0 | 66.4 | 62.5 | 53.1 | 20.21 |
| 74 | 328.7 | 75.0 | 79.3 | 66.5 | 62.6 | 52.7 | 20.56 |
| 75 | 333.8 | 74.2 | 78.5 | 66.6 | 62.6 | 52.3 | 20.91 |
| 76 | 339.0 | 73.3 | 77.6 | 66.7 | 62.7 | 51.8 | 21.25 |
| 77 | 344.0 | 72.4 | 76.8 | 66.8 | 62.8 | 51.3 | 21.59 |
| 78 | 349.0 | 71.5 | 75.9 | 66.9 | 62.8 | 50.8 | 21.93 |
| 79 | 354.0 | 70.6 | 75.0 | 67.0 | 62.9 | 50.3 | 22.26 |
| 80 | 358.9 | 69.7 | 74.1 | 67.1 | 62.9 | 49.8 | 22.58 |

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# EGG GRADING

## Expected Egg Grades (%) for different Egg Weights*

| Egg Weight (g) (Flock Average) | XL above 73 g | L 63 – 72.9 g | M 53 – 62.9 g | S below 53 g |
|---|---|---|---|---|
| 46 | 0.0 | 0.0 | 1.5 | 98.5 |
| 47 | 0.0 | 0.0 | 3.4 | 96.6 |
| 48 | 0.0 | 0.0 | 6.8 | 93.2 |
| 49 | 0.0 | 0.0 | 12.2 | 87.8 |
| 50 | 0.0 | 0.0 | 19.6 | 80.4 |
| 51 | 0.0 | 0.0 | 28.7 | 71.2 |
| 52 | 0.0 | 0.1 | 39.1 | 60.8 |
| 53 | 0.0 | 0.4 | 49.6 | 50.0 |
| 54 | 0.0 | 0.9 | 59.6 | 39.6 |
| 55 | 0.0 | 1.9 | 67.9 | 30.2 |
| 56 | 0.0 | 3.7 | 74.1 | 22.2 |
| 57 | 0.0 | 6.6 | 77.6 | 15.8 |
| 58 | 0.0 | 10.9 | 78.2 | 10.9 |
| 59 | 0.0 | 16.6 | 76.0 | 7.3 |
| 60 | 0.1 | 23.7 | 71.5 | 4.8 |
| 61 | 0.2 | 31.7 | 65.0 | 3.0 |
| 62 | 0.6 | 40.3 | 57.2 | 1.9 |
| 63 | 1.2 | 48.8 | 48.8 | 1.2 |
| 64 | 2.2 | 56.6 | 40.5 | 0.7 |
| 65 | 3.9 | 63.1 | 32.6 | 0.4 |
| 66 | 6.5 | 67.7 | 25.6 | 0.2 |
| 67 | 10.0 | 70.3 | 19.6 | 0.1 |
| 68 | 14.7 | 70.6 | 14.6 | 0.1 |
| 69 | 20.4 | 68.9 | 10.7 | 0.0 |
| 70 | 27.0 | 65.3 | 7.6 | 0.0 |
| Week | Expected Egg Grades of total Eggs | | | |
| 70 | 2.1 | 45.9 | 45.8 | 6.2 |
| 72 | 2.2 | 46.6 | 45.1 | 6.0 |
| 74 | 2.4 | 47.3 | 44.4 | 5.8 |
| 76 | 2.6 | 48.0 | 43.7 | 5.7 |
| 78 | 2.8 | 48.6 | 43.1 | 5.5 |
| 80 | 3.0 | 49.2 | 42.5 | 5.4 |

*) excluding double-yolk eggs

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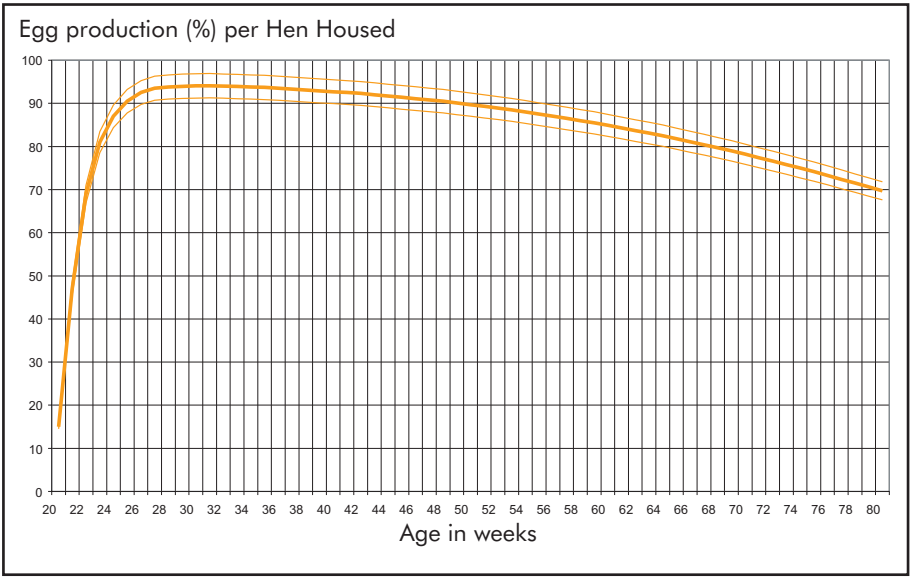
# EGG PRODUCTION CURVE

## LOHMANN LSL-CLASSIC Layers

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# BEAK TREATMENT

Under optimal conditions beak treating should not be necessary. In practise, it is widely used as an efficient precaution to cannibalism and feather pecking. Such behaviour may develop at any age as a result of excessive light intensity, unbalanced feed, poor ventilation, overstocking or boredom.

In closed houses with cage management, it should be possible to control cannibalism and feather pecking with appropriate lighting programmes.

For floor management and/or open houses with uncontrollable light intensity, we recommend beak treatment subject to local animal welfare regulations.

Observe the following precautions:

- Treat only healthy, unstressed birds, at the age of 7 - 10 days
- Allow only experienced personnel to do the work
- Work slowly and carefully
- Use only equipment and blades in perfect working order; adjust the blade temperature so that cauterisation is guaranteed and the beak is not damaged
- Do not feed for 12 hours before treating
- Offer free feeding immediately after treating
- Increase the level of feed in the troughs
- Increase the temperature in the house for a few days after treating
- For 3 - 5 days after beak treating provide an extra hour of light and supply feed in the late evening or at night
- Giving vitamins via the drinking-water can also help to alleviate stress

# VACCINATION

Vaccination is an important way of preventing disease. Different regional epidemic situations require suitably adapted vaccination programmes. Please be guided, therefore, by the advice of your local veterinarian and poultry health service.

## Vaccination Methods

**Individual Vaccinations** - injections, eye-drops - are very effective and generally well tolerated but also very labour intensive.

**Drinking Water Vaccinations** are not labour intensive but must be carried out with the greatest care to be effective. The water used for preparing the vaccine solution must not contain any disinfectants. During the growing period the birds should be without water for approximately 2 hours prior to vaccination. During hot weather reduce this time accordingly. The amount of vaccine solution should be calculated to be completely consumed within 2 - 4 hours. When vaccinating with live vaccines, add 2 g of skim milk powder per litre of water in order to protect the virus titer.

**Spray Vaccinations** are not labour intensive and are highly effective, but may occasionally have side effects. For chicks up to the age of 3 weeks apply only coarse spray. Use distilled water for vaccination.

### Example of a Vaccination LOHMANN LSL-CLASSIC Layer

| Disease | Appearance | | Vaccination methods | Comments |
|---|---|---|---|---|
| | worldwide | regional | | |
| Marek | ● | | I | Single vaccination of day-old chicks in the hatchery |
| Coccidiosis | ● | | DW / F | |
| Newcastle | ● | | DW / Sp / I | Compulsory by law |
| Gumboro | ● | | DW | |
| Infectious bronchitis | ● | | DW / Sp / I | |
| AE | ● | | DW | Laying hens and parent birds must be vaccinated |
| Mycoplasma gallisepticum | | ● | I | |
| Fowlpox | | ● | WW | |
| Pasteurellosis | | ● | I | |
| Coryza | | ● | I | |
| Salmonella | ● | | DW in I | Compulsory by law for flocks of 250 pullets or more |
| ILT | | ● | DW / ED | |
| EDS | | ● | I | |
| Colibacillosis | ● | | I | |

DW Drinking water Sp Spray I Injection F Feed ED Eye drops WW Wing Web

## General Recommendations

Only healthy flocks should be vaccinated. Check the expiry date. The vaccine must not be used after this date. Keep records of all vaccinations and vaccine serial numbers.

## Special Recommendations

**Marek Re-Vaccinations** have proved successful after long transportation and in areas with high infection risk. Consult your veterinarian and the Lohmann veterinary laboratory for further information.

**Mycoplasmosis Vaccinations** are only advisable if the farm cannot be kept free of mycoplasmosis. Infections with virulent mycoplasma species during the production period lead to performance depression. The best performance is achieved by flocks which are kept free of mycoplasmosis and are not vaccinated.

**Applying Vitamins** in the first two to three days after vaccination can help to reduce stress and prevent undesired reactions. How far this is necessary depends on the specific situation on each farm.

**How Lohmann Tierzucht is calculating the energy content of feed and raw materials (International WPSA – formula):**

**ME MJ/kg =** g crude protein x 0,01551
+ g crude fat x 0,03431
+ g crude starch x 0,01669
+ g sugar x 0,01301 (as Saccharose)

**ME = metabolizable energy in MJ/kg**

**1 Kcal = 4,187 kJ**

Consultation and diagnostics in all questions of poultry health through:

**LOHMANN TIERZUCHT GmbH**
**Veterinary Laboratory**
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The above performance data are based on traditional cage management. Different management systems or poor environmental, feeding or management conditions could lead to considerable deviations in performance.


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