

Management instructions

## **Broiler breeder management**

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## Overview of changes / updates

<b>Name of chapter</b>	<b>Type of change / update</b>	<b>Product information / Code of the person in charge</b>	<b>Date of edition</b>	<b>Page</b>
3.2 "Drinking system"		SSa	02/2021	15
4.3.2 "Measures during the production period"	Additional note regarding the opening and closing times for the nest	DLa	01/2015	26
8 "Management errors and their effects"	Chapter inserted	DLa	01/2015	54



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## 1 About this manual

Observe the instructions in this manual to ensure correct and safe use of the system.

Keep this manual safe for future use.

All persons assembling, operating, cleaning and servicing this system must be familiar with the contents of this manual.

These persons must always have access to the manual. Keep this manual in the immediate vicinity of the system for this reason.

Observe the comprised safety instructions!

If this manual is damaged or lost, request a new copy from **Big Dutchman**.

This manual is protected by copyright. The information and drawings included in this manual may not be copied without the manufacturer's consent, nor may they be misused or disclosed to third parties.

The contents of this manual may be altered without prior notice.

If you find mistakes or unclear information in this manual, please do not hesitate to let us know.

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## 1.1 Structure of the safety instructions

### **DANGER!**

This indicates risks that will lead to personal injury resulting in death or to serious injuries.

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### **WARNING!**

This indicates risks that could lead to personal injury resulting in death or to serious injuries.

---

### **CAUTION!**

This indicates risks or insecure procedures that could lead to moderate or minor injuries.

---

### **NOTICE!**

This indicates notes preventing property damage and leading to an effective, economic and environmentally-conscious handling of the system.

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## 1.2 Supplier's documentation

The supplier's documentation includes all instructions for components that are supplied by **Big Dutchman** but not manufactured by **Big Dutchman**, for example motors. These instructions are usually supplied with the respective component. If this is not the case or if the language of the corresponding country is not included, please request this documentation from **Big Dutchman** .

It is essential to observe the instructions in the supplier's documentation!

## 2 Safety

### 2.1 Designated use

This manual serves as user manual for the broiler breeder management. The supplied system only serves for the management of broiler breeders and normally comprises the following components:

- nest area (provided that it is no pure rearing house)
- manure pit area (provided that it is no pure rearing house)
- feeding system including silo, scale and transport unit
- drinking system
- climate system including computer

The **Big Dutchman** system may only be used for the purpose for which it is designated. Any deviating use is considered non-designated use. The manufacturer shall not be liable for any damage resulting from such non-designated use. The user alone bears the risk. The designated use also includes the exact compliance with operating, maintenance and assembly requirements of the manufacturer.

## 2.2 General safety regulations

Only work with suitable tools and observe the local accident prevention regulations.

### **WARNING!**

Live parts may be bare when performing different types of tasks. Touching live parts can lead to injuries caused by electric shock and short circuits.

- ▶ Set the main switch to "Off" before starting any repair or maintenance tasks.
- ▶ Secure the system against reactivation.
- ▶ Attach a fixed sign to indicate that maintenance and repair tasks are in process!
- ▶ Never touch bare electrical components.
- ▶ Equipment with bare electrical components must not be used by the operating staff.

Check safety and function control devices to ensure safe and accurate operation after carrying out any tasks.

Observe the regulations of local water distribution and power supply companies.

### **WARNING!**

Defective or disassembled safety devices can lead to serious injuries or to death!

- ▶ It is strictly forbidden to remove or put out of operation any safety device.
- ▶ If safety devices are damaged, immediately put the system out of operation. Lock the main switch in zero position and eliminate any damage.
- ▶ Make sure that all safety devices are properly mounted and function after work on the system has been completed and before putting the system into operation (again).

### **WARNING!**

- ▶ Parts lying about on the system and in its vicinity can cause persons to stumble and / or fall and thus risk injuring themselves by contact with system components.
- ▶ Parts lying about in or on the components can lead to serious damage of the system.
- ▶ Never deposit objects (e.g. spare parts, replaced parts, tools, cleaning tools etc.) in the accessible areas of the system or in the surrounding areas after having worked on the system!
- ▶ **Before** putting the system into operation again, assure yourself that all loose or replaced parts have been removed from the system components!

 **DANGER!**

Persons may be electrocuted or suffer serious electrical injuries if water from leaking hoses, seals and pipes reaches live parts.

- ▶ Disconnect the main power supply.
- ▶ Interrupt the main water supply.
- ▶ Only now may you enter the part of the house where large quantities of water have escaped.

 **NOTICE!**

Leaking hoses, seals and pipes can cause structural damage or destroy electrical systems by short circuits.

- ▶ Check regularly whether large quantities of water are escaping and eliminate the leaks as soon as possible.

 **WARNING!**

Children must not access the system. The safety distances for the system are not designed for children. A risk of injury cannot be excluded, even for supervised children.

## 2.3 Operator's responsibility

The operator is subject to the legal obligations regarding occupational safety and is responsible for the staff's safety. All safety, accident prevention and environmental protection regulations applicable for the area of use of the system must be observed. The following is especially important:

The operator must clearly specify responsibilities for operation, maintenance and cleaning.

The operator must provide the staff with the necessary personal protective equipment.

The operator is responsible for

- using the system in compliance with the designated use;
- ensuring that the system is only operated in an excellent state from the technical point of view and that maintenance intervals are observed;
- ensuring that his staff is trained to use the system;
- ensuring that operation instructions are prepared for the system.

## 2.4 Staff qualifications

Staff must consist of qualified persons who can be expected to perform their tasks reliably. Persons whose ability to respond is impaired, e.g. by alcohol, drugs or medication, must not work on the system. The operator is responsible for which persons he employs. **Big Dutchman** does not assume any liability for personal injury and property damage caused by insufficiently qualified staff.

## 2.5 Personal protective equipment

### **WARNING!**

The following instructions apply to any task carried out on the system.

- ▶ Wear **close-fitting protective clothing** and **protective footwear**.
- ▶ Use **protective gloves** where there is a risk of hand injuries and **safety goggles** where there is a risk of eye injuries.
- ▶ Do not wear **any rings, necklaces, watches, scarves, ties or other items** which could get caught in parts of the system.
- ▶ Make sure that **long hair is always tied back**. Hair can get caught in driven or rotating working units or parts of the system, resulting in serious injuries.
- ▶ When working underneath the system **always** wear a **hard hat!**

## 2.6 Ordering of spare parts

### **CAUTION!**

For your own safety, use original **Big Dutchman** spare parts only. For third-party products that have not been released or recommended and for modifications (e.g. software, control units), judging whether there is a safety risk in connection with **Big Dutchman** systems is not possible.

### **NOTICE!**

The exact description of the spare parts to be ordered can be found by means of the position number in the spare parts list.

#### **Indicate the following when ordering spare parts:**

- the code number and description of the spare part;
- the customer number or order number;
- the current supply, e.g. 230 / 400 V – 3 Ph – 50 / 60 Hz.

## 2.7 Safety instructions when operating electrical appliances

### NOTICE!

Only qualified electricians may install and work on electric parts / assembly groups in accordance with electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).

### WARNING!

If an electric part is open, dangerous electric tensions are bare. Be aware of the danger and keep staff of other professions away from the danger zone.

### NOTICE!

Do not install control devices directly in the house but in the service room to prevent corrosion caused by e.g. ammonia gas.

### 2.7.1 Protective-equipotential bonding (earthing) of the system

The system must be earthed professionally by the operator or a company commissioned by him at suitable points and according to the valid local guidelines and standards (e.g. IEC 60364-7-705 mod. 2006 / DIN VDE 0100-705: Low-voltage electrical installations – part 7-705: Requirements for special installations or locations – Agricultural and horticultural premises) for protective-equipotential bonding.

The earthing points must be connected with the foundation earth electrode.

#### **Recommended earthing points:**

1 x per system row near the foundation earth electrode.

**The material required for earthing is not included in the Big Dutchman delivery.**

### 3 System description

Broiler parent management demands a lot from the farm management.

The farm manager must expend much more time per bird in broiler breeder management, in comparison to other poultry houses. It must permanently be controlled in which direction the flock develops. Here, special attention is always paid to the physical conditional of males and females.

The farm manager must always cope with the balancing act between good reproduction performance and a balanced weight gain. A flock is influenced considerably by the conditions in the houses, apart from the genetics.

This manual shall be a tool for the farm management to comprehend the different processes in the house. In this manual, you will find some approaches for different situations.

The following statements of **Big Dutchman** are based on discussions with farm managers, breeding companies as well as external consultants.

#### NOTICE!

This manual shall only be considered as addition to the guidelines and recommendations of the respective breeding companies. When in doubt, the individual recommendations of the integrations or breeding companies should always be observed.

The broiler breeder management systems comprehend different equipment components (feeding, drinking system, nest system).

In this chapter, the equipment normally used in broiler breeder management is only described briefly. In order to adjust the individual system components correctly, it is absolutely necessary also to observe the system-dependent user manuals.



Figure 3-1: House with nest NXB (North American and Asian area)

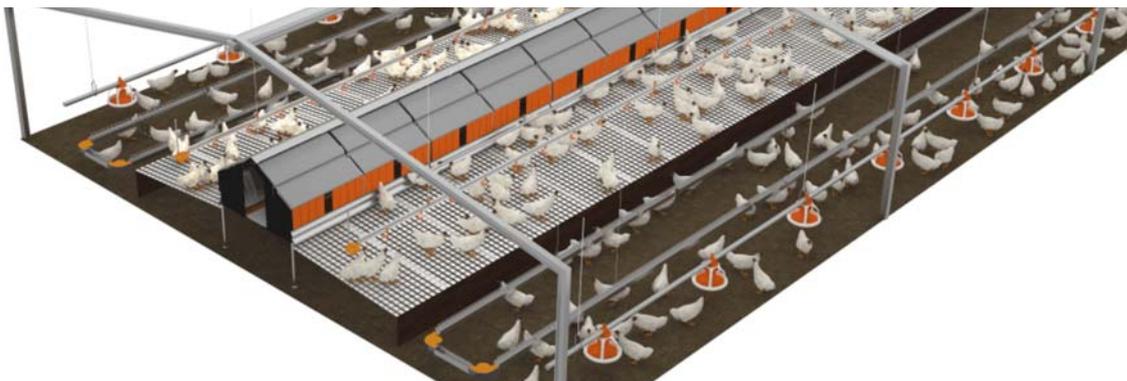


Figure 3-2: House with group nests (Colony nests)



Figure 3-3: House with manual nests

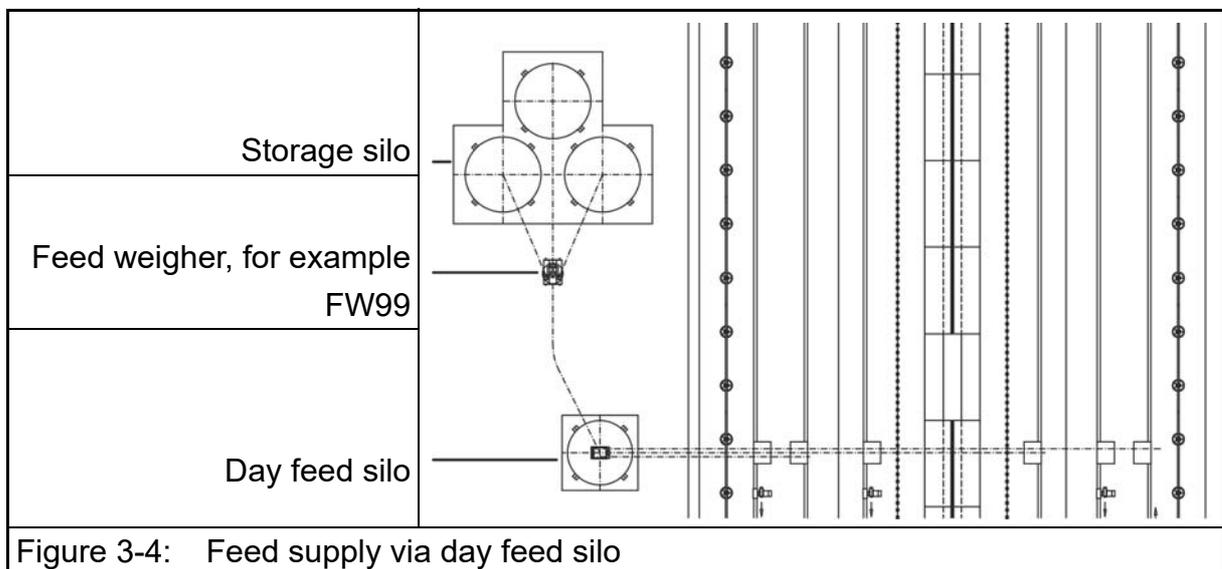
### 3.1 Feeding system

Broiler breeders are fed restrictively. Males and females obtain different feed qualities and feed quantities. Two different feeding systems are used so that the males and females can be fed separately.

#### 3.1.1 Feed supply via day feed silo

There are different possibilities for weighing and dosing the feed.

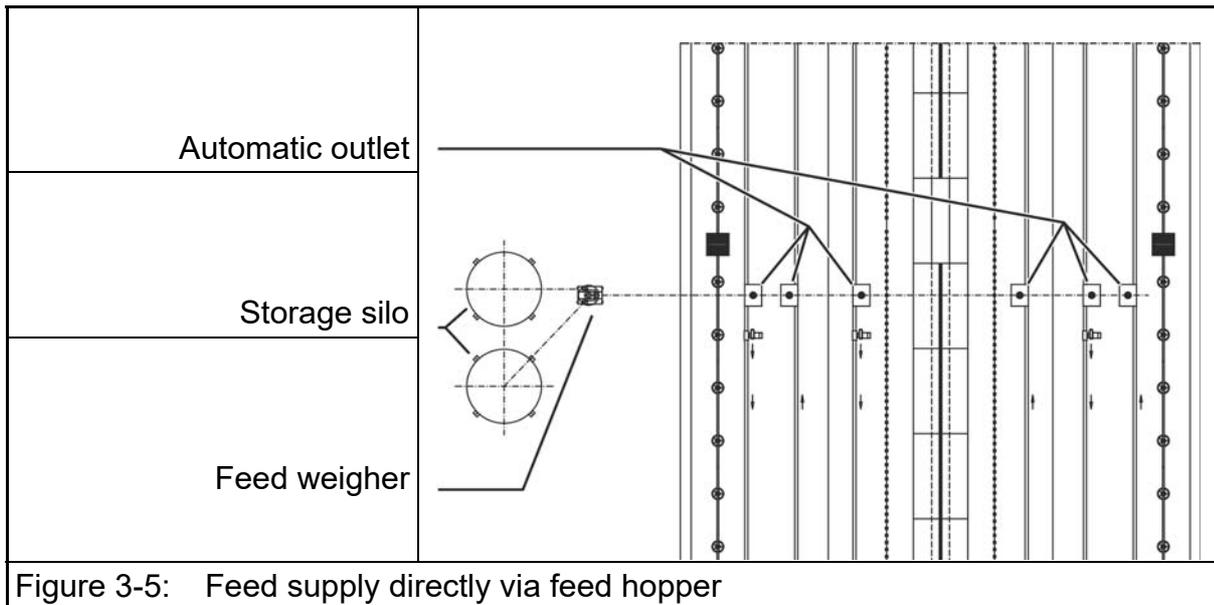
The most current method is to weigh the feed long before feeding and to fill it into a day feed silo. When the feeding starts, sufficiently dimensioned spiral conveyors ensure that there is always enough feed in the feed hopper in the house. If the day feed silo is empty, the filling process is stopped.



### 3.1.2 Feed supply directly via feed hopper (option)

Another possibility is a destination feeding. In case of this feeding type, the feed is not weighed in a day feed silo but distributed directly on the single feed lines in the house. For this, the feed hoppers on the lines must have a sufficient size.

In case of this option, the feed lines are started for the feeding process, the feed level in the feed hopper decreases until a sensor in the feed hopper signals "empty". Then, the system is switched off since the daily feed quantity has been dispensed.



### 3.1.3 Feeding system chain feeding [for females]

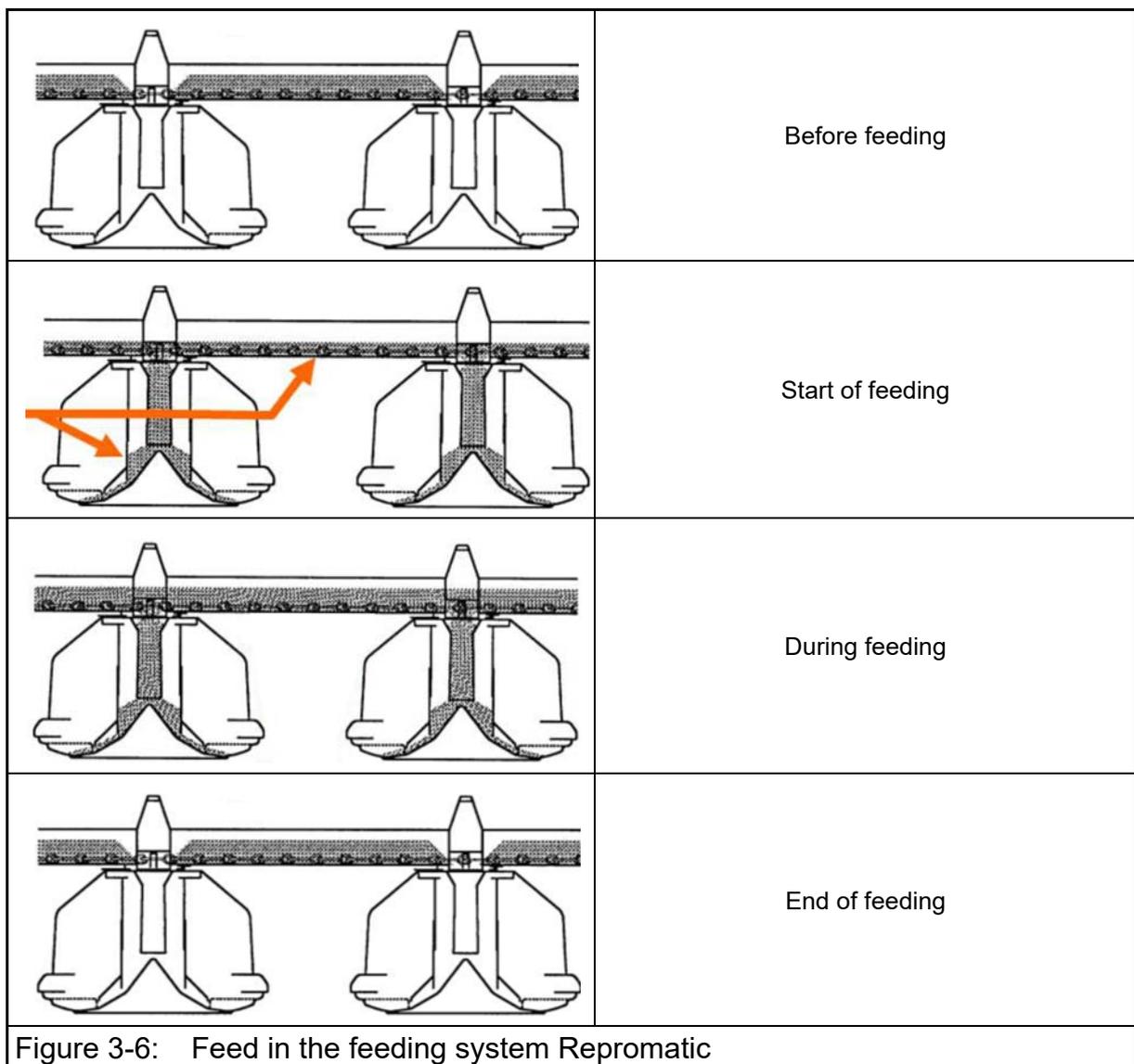
The females are fed via feed chains in broiler breeder houses. This consists of open-top troughs in which a chain lies. With this chain the feed is pulled in the troughs and distributed.

Chain feeding systems are always circuits, i.e. the chain must always move in a circle. This means, there is a forward and return run. The feed is metered via one or several feed hoppers on the chain, depending on the length of the system. For broiler breeder houses, we generally use chain drives with a speed of 36 m/min. so that the feed has reached the entire circuit within approx. 3-5 minutes.

### 3.1.4 Feeding system Repromatic [for females] (option)

The feeding system Repromatic is an option and can be used instead of a chain feeding system for the male feeding. This system consists of circuits with feed channels and chains therein, similar to the chain feeding system. The difference is that feed pans are suspended under these feed channels. The birds cannot eat directly from the chain above.

In case of the Repromatic system, the feed channels remain filled after each feeding. When the feeding process is started, the feed which lies in the channel between two pans, drops into the next feed pan. Thus, all birds will have feed available at their eating place from the first second on. This reduces the stress and improves the uniformity of the flock.



### **3.1.5 Feeding system Augermatic Male Pan [for males]**

The ratio of males in a broiler breeder production house is normally between 8 - 12%. Therefore, the need for feeding systems is correspondingly lower than for females.

The Augermatic is a straight running spiral conveying system with steel tubes. Feed pans which are especially designed for the male feeding are suspended under the tubes. From these pans, the males are taking their feed rations. The supply of the feed hopper of the Augermatic male pan line is often carried out manually. Automatic solutions with a spiral conveyor are mostly realised by means of a dial-type crane scale per line, independent of the female feeding.

### 3.2 Drinking system

Drinker lines in broiler breeder production houses must be placed close to the nest. Broiler breeders are "lazy" animals, they only move unwillingly. They often only jump onto the manure pit as they find water there. Generally, round drinkers with open water as well as nipple drinkers are used in broiler breeder houses, depending on the request.

#### CAUTION!

According to DIN EN 1717, water sources in technical systems for livestock management must be assigned the highest possible hazard because they pose a health hazard for humans due to microbes and viruses or chemical and biological substances. This means that within the scope of DIN EN 1717, a direct connection to the public water distribution network is not permitted under any circumstances.

Additionally, all water sources not intended for extraction of water for human use must be equipped with a corresponding sticker or prohibitory sign according to ISO 7010, P005 ("Not drinking water"). The stickers can be purchased from Big Dutchman.



Code no.	Description
00-00-2128	Sticker: Logo – Not drinking water

Also comply with the regulations of local water distribution and power supply companies.

The water connecting unit is installed in the service room of the house. This normally consists of filters, pressure regulators, water meter and medicator.

### 3.3 Raised slats / Slat level [rearing]

For broiler breeder houses, we recommend to offer a raised slat level ("raised slats") for perches under some drinker lines. In this way, the birds learn to jump so that they can reach the manure pits without any problem. The **Big Dutchman** slat level consists of a substructure from metal as well as a plastic slat. The slat level can be ordered as standing or suspended version. The height of the slat level can be planned differently and should be determined before placing the order. Normally it has a dimension of 40-60 cm.



Figure 3-7: Broiler breeder rearing house with raised slats

## 3.4 Nest system

A nest system consists of nest, egg channel and manure pit. The following functions are covered by the nest system:

- Egg laying of the hen
- Transport of eggs
- Manure separation, cleanness of eggs

The functioning of the nest system can only be ensured by a proper management of the farm staff.

### 3.4.1 Nest

The nest area is designed that way that the hens preferentially frequent this area for laying their eggs. The nest area in automatic nests is inclined towards the egg belt and equipped with a perforated and closed nest insert.

The nest BD Relax is provided with following functions:

- It can be closed automatically. For this, the back wall of the nest moves towards the nest entrance.
- The eggs are transported automatically to the beginning of the nest by means of an egg belt. Then they will be taken up by the farm personnel or transferred to continuing conveying belts.
- Thanks to the plug-in connections, the assembly of the nest system is much easier than the assembly of comparable systems.
- The two-parts plastic roof allows for an easy nest control/control of egg channel.
- The perforated nest insert largely cleans itself due to the movement of the birds.

The nest area can be closed automatically (e.g. at night).

- **Nest locking mechanism for nest Colony MB/ Relax:**

The back wall of the nest is turned towards the nest hole via an electronic linear drive unit.

- **Nest locking mechanism for nest Colony C2+:**

The movable floor of the nest is pulled up by means of steel cables until it is up at 90° angle and thus closes the nest.

- **Nest locking mechanism for single nest NXB:**

The nest is closed by means of a tube which is suspended in the nest and brought into a closing position via traction ropes.

The Colony nests stand independently on a stable substructure from plastic and metal. The single nest NXB stands on a manure pit which supports the nest. The nest boxes are arranged in a row side by side. In this way, they form a nest row which normally runs in the centre in longitudinal direction through the entire house. A tube runs on both sides along a nest row in order to connect a manure pit to a Colony nest.

Apart from the automatic nests, nests with manual egg collection system are often used as well all over the world. In those nests, the egg remains in the animal area until the farm staff collects it.

### 3.4.2 Egg channel

A conveying belt (egg belt) is placed in the area behind the nests to transport the eggs which were laid in the nest and rolled off. The full egg belt is always pulled towards the drive unit via an electric drive. At the end of the nest row, the egg belt is turned round.

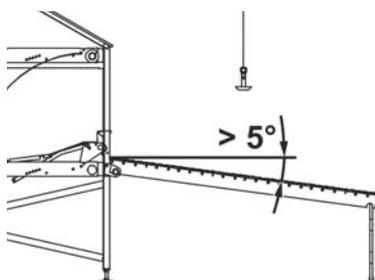
### 3.4.3 Manure pit

The pit area is placed directly in front of the holes of the nest boxes. The manure pit consists of a substructure out of plywood and flat steel of metal. Accessible plastic slats are placed on it.

On the nest side, the manure pit is supported via flat steels on the nest. The other side is stabilised and closed by means of plywood.

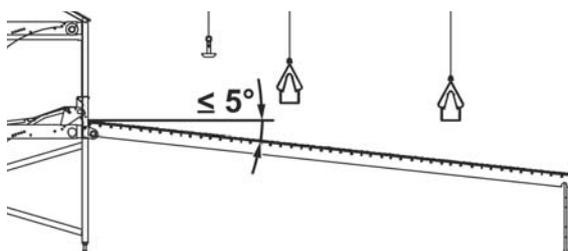
The manure pit serves for preventing soiling in the nest and provides a sleeping area for the birds. Two versions are available:

#### Short manure pit:



Short manure pits have an angle of  $> 5^\circ$ , through this the hens do not have a safe stand and are reluctant to be mated by the male there. Therefore the manure pit is only regarded as dirt barrier for the nests.

#### Wide manure pit:



Wide manure pits have got an angle of  $\leq 5^\circ$ . They cover up to 50% of the house width, together with the nest. The females can stand safely enough to be mated by the male.

All birds can stay on the wide manure pit at night. The next morning, they already stand beside the nest and have not built a comfortable scrape in the litter. This variant can have influences on the floor egg rate.

### Jump height:



The jump height shall be as low as possible, however, it should still be high enough to prevent that the manure accumulates up to the slats until the end of the laying period.

The jump height of a manure pit front should in no case be above 550 mm. Flocks which have not learned to jump onto a higher level during the rearing period, have difficulties to use the manure pit.

**Big Dutchman** recommends a jump height of 450 mm (consisting of boards with a height of 400 mm + approx. 50 mm slats and flat steels) on the manure pits.

### 3.4.4 Passages (option)

Passages can also exist next to the nest boxes in a nest row. Thanks to these passages, it is possible for both the birds and the farm personnel to pass the nest row. A passage necessarily replaces the nest at this place.

### 3.5 Technical data

#### **i** NOTICE!

The technical data for the different equipment units are indicated in the respective user instructions.

#### 3.5.1 Dimensions

##### Manure pit:

Apart from the nest itself, the width of the manure pit is very important. **Big Dutchman** offers a standard plastic slat of 1.2 m x 0.6 m. From this, the standard manure pit widths of 1.2 m, 2.4 m, 3.6 m,... are resulting.

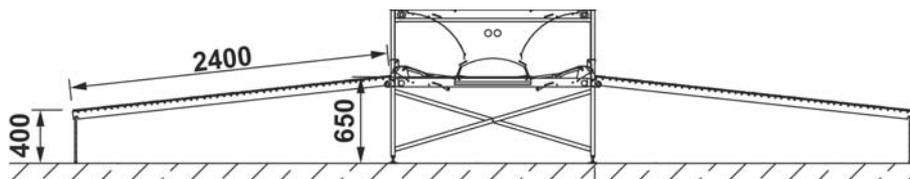
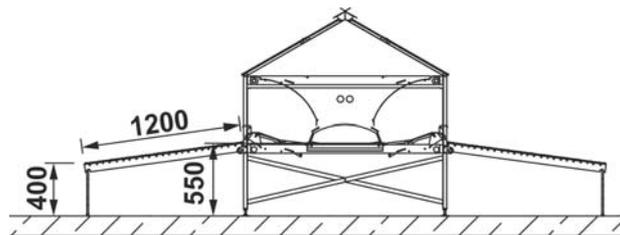


Figure 3-8: Example layouts for manure pit

Furthermore it is possible to shorten

the plastic slats in steps of 30 cm and to deliver the manure pit with an appropriate length.

### 3.5.2 Performance data, operating data

The following performance data should be realizable with a matched house concept and a reasonable management.

- Floor egg rate: below 2%

#### NOTICE!

Attention

At the beginning of the laying period, the floor egg rate can be significantly above 2%.

- Cracked egg rate: below 2%

Especially for broiler breeder management one should have an elaborated concept with which the floor egg rate can be decreased step by step. Such concepts are described in the management manuals of the breeding companies. Contact your animal supplier as well regarding this subject (=> Chapter 4.3 "Avoid floor eggs")

The standard egg belt speed is either 3 or 2.6 m/min. per drive unit. Optionally, this speed can be adjusted continuously between 2 and 3.6 m/min. by means of a "vario speed" control unit.

### 3.6 Notes for layout and calculation

When laying out a nest system, the nationally or regionally valid guidelines or laws are generally to be observed. If these do not exist, inquire the guidelines for the respective breed.

## 4 Management of a broiler breeder house

### 4.1 Broiler breeders [rearing]

#### 4.1.1 „Day old to death“

The type of broiler breeder management „Day old to death“ means that the birds are housed in as day-old chicks and remain in the house during the **rearing period** and also during the **production period**. This means that the birds are not transferred to another house after the rearing period.

This management type is often used for grandparents or even great-grandparents since a transport of the animals often represents a hygiene and injury risk. The disadvantage of this management type is that the equipment (especially the nest) is not used for a long time and thus, the investment per animal place is disproportionately higher compared to a divided system.

During the rearing period, the **feeding system** is different than during the production period; i.e. the equipment for separate sex feeding is dismantled. Therefore the grille is removed for the chain feeding, and in case of a pan feeding the eating windows are opened as far as possible.

Especially during the first weeks it is important that the animals have free access to the feed area and can leave this again without problem. The males are often not reared together with the females and are only housed in when the production period starts. Therefore, a separation of the sexes during the feeding must only be realised from this time on.

#### NOTICE!

The chicks are usually reared on the floor in such a house since they cannot use the manure pit yet as day-old chicks.

=> For this reason **drinkers in the litter area are absolutely necessary**.

After the rearing period, the drinkers have to be removed from the litter!

The drinker in the litter area as well as the drinker on the manure pit must be designed large enough so that all birds can be provided with water.

If the drinkers remain in the litter area during the production period, there is no stimulation for the birds to jump onto the manure pits and thus find and use the nest. This would result in a higher floor egg rate.

Normally the **nest** is already in the house during the rearing period so that it is not soiled by the birds. The nest is only opened at the start of laying activity.

### 4.1.2 Before moving birds in [rearing]

1. Clean and disinfect the house thoroughly (=> 7 "Hygiene, health and safety, cleaning and disinfection"). The house must be completely free from disinfectants and humidity. This can be realised e.g. by means of a ventilation system.
2. Pre-heat the house at least 24 hours before the birds are moved in to ensure that the sole plate has taken the temperature and the humidity in the component parts is dried. Check the **ventilation and heating settings** for correctness and proper functioning. The air flaps should be adjusted that way that they do not guide the air directly onto the birds. Adjust the farm computer and ventilation rate to the current age of the birds.
3. Distribute the **litter** evenly on the dry house floor. Depending on the quality of the house floor insulation, you can bring more or less litter material on the floor.
4. Put some chick paper with **starter feed** under the drinker lines.
5. Rinse the **drinker lines** with fresh water shortly before the birds are moved in. Actuate the nipples shortly to allow the birds to find the water more quickly.
6. Provide a passage which is locked for the chicks, e.g. by suspending chick papers above the feeder and drinker lines. In this way you can move the chick containers in and out without endangering the chicks.

### 4.1.3 During the housing in [rearing]

1. Only move the chick containers within in the passage locked for the chicks! From there, the chicks can be distributed evenly in the entire house. Put the chicks on chick papers laid out before and coated with feed.
2. Open the house doors as shortly as possible when the birds are moved in. The ventilation must be adapted to the birds and draught must be avoided right from the beginning.
3. The birds should be moved in speedy but without any stress. Let the birds calm down during the first 24 hours after they have been moved in.

## 4.2 Broiler breeders [production]

### 4.2.1 Before moving the birds in [production]

When the flock is moved from the rearing to the production house, this means stress and risk of injury and infection for the birds. In order to keep these sources of danger as low as possible, they should be moved speedily and smoothly.

1. The house should be cleaned and disinfected thoroughly (=> 7 "Hygiene, health and safety, cleaning and disinfection"). It must be completely free from disinfectants and humidity. This can be realised e.g. by using a ventilation system.
2. Check the equipment for proper functioning.
3. Distribute the **litter** evenly on the dry house floor. You can put more or less litter material on the floor, depending on the quality of the floor insulation.

**i NOTICE!**

Do not put too much litter material in production houses to avoid that the hens mix up the soft litter with the nest and then lay their (floor) eggs there.

If the sole plate is well insulated, you should only use a very thin layer of litter (1 - 2 cm).

4. If possible, raise the **feeding lines** up to the ceiling, if these are suspended. In this way they do not form a barrier when the birds are moved in.
5. Please contact the breeder to be well prepared for possible specific features of a flock. For example, it can be determined previously whether the birds were vaccinated against local diseases and whether the birds in the rearing house have learned to jump on a manure pit.

The **feeding times** should also be arranged beforehand with the breeder. At the end of the rearing period, the birds should be fed at the same time as in the production house later on. This prevents stress when the birds get used to a new feeding time.

6. Consult the breeder to learn the **light intensity/time** in the rearing house.  
During the production phase, the light intensity must be higher and the time of lighting must be longer than in the rearing period to stimulate all hens (at the same time) to lay their eggs.
7. Rinse the **drinker lines** with water shortly before the birds are moved in.
8. Especially in case of short manure pits:  
Adjust the drinker line very high or lift it completely out of the animal area.  
In this way you can avoid that the hens perch on the drinker line when they are moved in. They could get injured thereby or damage the drinker line.
9. Organise a group of helpers depending on the flock size in order to move the birds in as quickly as possible.

#### **4.2.2 During the moving in [production]**

1. Many a time, the males are housed in some time before the females are moved in and are fed at least once. This has the advantage that the males already know which eating place is reserved for them. In this way they will not try so often later to get the female's feed.
2. The females should generally be let out on the manure pit. Distribute the boxes with the birds on the manure pit and open them speedily.
3. Put the drinker lines immediately back to the animal area since the birds are thirsty after the transport.

## 4.3 Avoid floor eggs

The floor egg rate is one of the most important key figures - apart from the cracked eggs and the fertility rate - in broiler breeder management. In the end, the number of hatched chicks per broiler breeder decides on the economic success of a house.

### 4.3.1 Train the birds' behaviour

Broiler breeders are able to learn certain behaviour patterns. However, if they have memorized a behaviour pattern, it is very difficult to change this again.

Due to this fact it is possible for the farmer to train his flock. On the one hand, the birds can be trained with certain measures that way that the cooperation is simplified. On the other hand, a "bad training" can make the work more difficult and uneconomic.

During the production period, the first weeks after moving in are very important. You should show the birds the way to the manure pits again and again. To this end, put the birds onto the manure pits already upon moving in. Walk along the house wall when controlling the animals, if possible. In this way, you can push the birds towards the nests. At the next bird control, you can change the direction so that the birds are always pushed in different directions, however, always towards the nest.

### 4.3.2 Measures during the production period

The beginning of the laying activity is the most important time to avoid floor eggs. At this time, the birds are looking for a suitable place to lay their eggs. In order to ensure that the birds recognise the nest as the only appropriate place, each other place must be made unattractive for the egg laying.

The following points are to be observed:

- Collect the floor eggs regularly and flush the hens. This is the most important measure to avoid floor eggs. If one egg lies in the litter, it will only take a short time and another one lies next to it.
- The bottom plate is well insulated, you should only use a very thin layer of **litter** (1 - 2 cm). In this way the birds cannot build a nest.
- Pay attention to the correct **ventilation/ temperature** in the house and especially in the nest area (=> chapter 4.3.3 "Ventilation/Fresh air guiding in the house").
- Monitor the **behaviour of the males**. If a male is very aggressive and the females hide below the feeding lines, he has to be sorted out. If the males visit the nest more often, the temperature in the house could be too low.

- Pay attention to the correct **lighting** in the nest. A too light or too dark nest is avoided (=> 4.3.4 "Lighting in the house").
- The **drinker line** should have a distance of at least 60 cm to the nest so that the drinking birds do not block the nests.
- Pay attention to the **opening and closing times of the nest**. The nest should be opened approx. 30 minutes before switching on and approx. 30 minutes before switching off the light.

If a computer-controlled lighting program is used with a dimmer, the nest should be opened approx. 30 minutes before the beginning of the *daybreak* and closed approx. 30 minutes before the beginning of the *dusk*.

Control the set times regularly and align them with the times of lighting. An alignment has to be carried out especially after the changeover from summer to winter time.

#### NOTICE!

The opening and closing times for the nest are recommendations of **Big Dutchman**. When in doubt, the individual recommendations of the integrations or breeding companies should always be observed.

Many farms make plans how often the floor eggs shall be collected a day. We recommend to plan the number of passages according to the number of floor eggs. Use a receptacle (e.g. a bucket) and collect the eggs therein. If the bucket is full after the collection, the time interval to the next collection must be shortened. If it is only half-full, you can wait longer. Generally it is assumed that for each found floor egg, another floor egg was tread down or picked up.

Remove floor eggs, they must not lie in the nest. Found floor eggs are often contaminated with manure. These eggs may cause severe problems in the incubator later on. If they crack, the eggs can possibly spoil a whole container of hatching eggs.

From the number of floor eggs one can draw conclusions regarding the nest acceptance by the birds. This acceptance is influenced by many factors as e.g. ventilation or illumination.

### 4.3.3 Ventilation/Fresh air guiding in the house

The ventilation is very important for avoiding floor eggs. Apart from draft, a heat accumulation in the nest may also lead to floor eggs.

- The hens shun areas with draft when laying eggs. Draft arises e.g. when the air from the fresh air inlet at the house wall is guided directly into the nest.

Furthermore it is possible that draft is deviated or reflected due to unevennesses at the house ceiling. This missing air can arise through obstacles as e.g. longitudinally mounted moisture-proof lamps.

Check the ventilation setting again and again in each season in order to avoid draft.

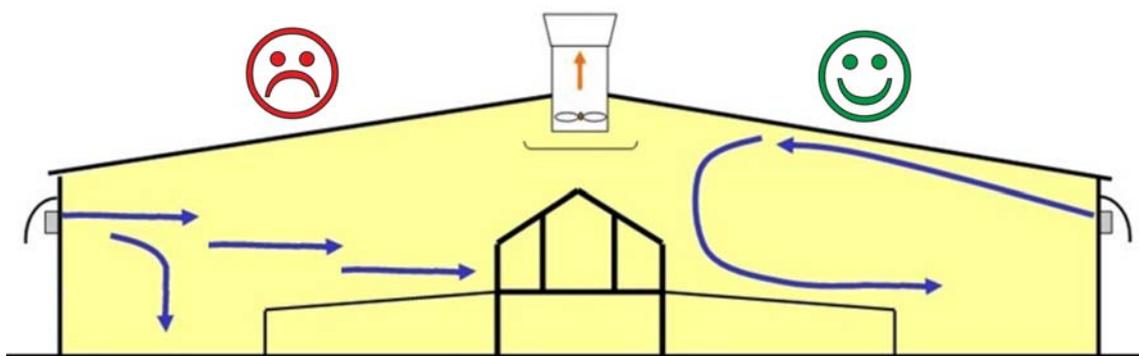


Figure 4-1: Air flow in the house (left = wrong / right = correct)

In case of a tunnel ventilation make sure that the air is not drawn from the service room via the egg channel into the nest. For that purpose it is helpful to cover the egg channel in the passage between service room and house when the eggs are not collected.

- Especially in hot regions it is possible that the hens shun the nest due to a too high temperature in the nest area. All **Big Dutchman** nests have got a structure which is open towards the top, thus allowing the hot air to flow out of the nest.

In hot regions, one should make sure that warm air can flow upwards out of the nest.

### 4.3.4 Lighting in the house

Similar to the ventilation, the lighting has a great influence on the floor egg rate. In houses with barriers (e.g. columns) it is generally more difficult to keep the floor egg rate low than in cantilever houses.

The hen is looking for a silent, separate place to lay her egg. For many hens the smallest shadow zone is sufficient to sit down for egg laying.

Therefore make sure when dimensioning the lighting that shadows only occur in those places where the hens shall lay their eggs.

- Do not install a light row above the nest to avoid shadowing in front of the nest. This shadow can be sufficient for some birds to sit down in front of the nest. If a light row already exists, you should dim this a little darker than the lights above the litter.

We would recommend to install only two or four lamp rows in a production house with double nest.

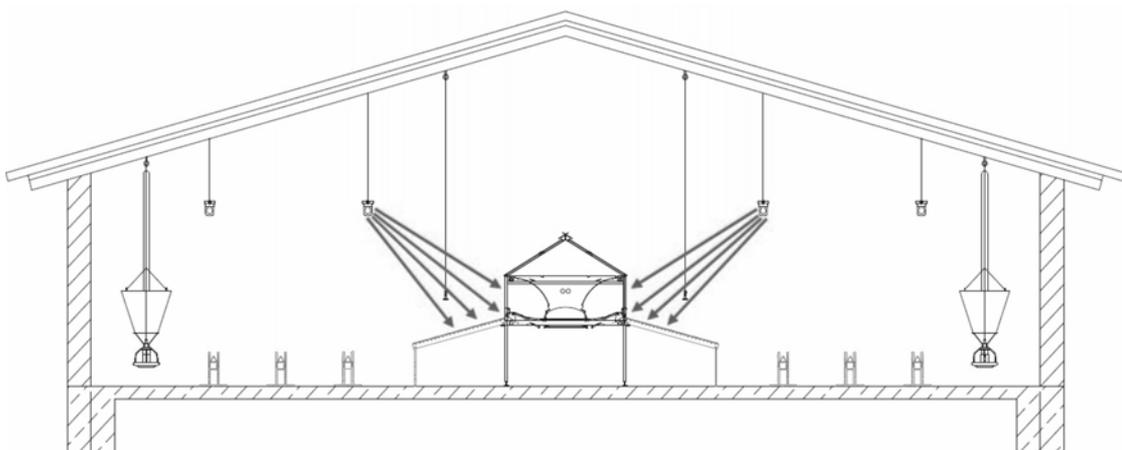


Figure 4-2: Lighting with two or four light rows in a house

- The areas along the outer wall and manure pit front must definitely be illuminated. Apart from the main lighting in the house, it is also possible to install an orientation light above the nest row. This light row does not serve for illuminating the house and can thus be switched off completely. Dim the light above the litter in the evening when the birds are looking for a roost. Then you should switch off the light in order to attract the birds to the manure pit for sleeping. This has the advantage that they wake up next to the nest: the way to the proper egg laying is shorter than in the litter. Moreover, the manure falls into the manure pit at night and does not pollute the litter.

## 4.4 Avoid cracked eggs

A high rate of cracked eggs (> 2%) can have several reasons. The age of the birds has an decisive influence on the quality of the eggshell, apart from the supply of the birds with enough calcium.

Apart from the shell stability, the number of cracked eggs can also be attributed to technical reasons. The main sources of errors are all transfer units, e.g. transfer from egg belt to a cross conveyor. The height of the transfer units must always be matched with each other to avoid that the egg falls too deep. It should also be avoided - according to the quality of the conveying belts - that an egg has a too fast roll-off speed onto the cross conveyor and then strikes against the end. If necessary, the cross conveyor should be stuffed additionally in the transfer area.



Figure 4-3: Transfer from nest to cross conveyor

Cracked eggs can also occur due to overcharged longitudinal egg belts. The eggs must be collected at least once a day. If there are nevertheless too many eggs on the belt, you should carry out another egg collection per day.

The conveying belts should be checked regularly. Remove parts which possibly protrude into the egg flow or stuff these. The conveying belt must not show damaged spots and the drive units must be readjusted regularly. The egg belt must run centrally in the drive unit and must not lift up on the left or right of the channel edge.

A light above the egg belt in the nest is not advisable. The birds are attracted by the light and peck at the eggs lying on the egg belt. This could result in cracked eggs.

## 4.5 Inspection of birds

Carry out a sufficient bird control in order to obtain a satisfactory performance of the birds.

Unlike finishing houses, the bird control in a broiler breeder house is not limited to health or feeding problems. Here, the willingness of the birds to perform is in the foreground. As already described in chapter 4.2 "Broiler breeders [production]", the health of the males is particularly important.

There are parameters by means of which the livestock owner can recognize whether a male does effect his performance or not. These parameters are:

- Weight of the males: Weigh the males regularly and adjust the feeding according to the breed.
- Optical control: Especially the very beauty males often do not mate. Following some very important observation points: The cloacae should be moist and surrounded by red skin. The feathers at the waist should be visibly worn off. The skin at the knee bend, at the beginnings of the feathers should be coloured red.

## 5 Operating the system

### 5.1 Feeding system

As described in chapter 3.1 "Feeding system", there are different possibilities to carry out the feeding. There are some basic rules which should be observed when distributing the feeding in broiler breeder houses:

- There must be an eating place for each single hen.
- After having started the feeding, feed must be available at each eating place within 3 minutes.
- Males and females are fed separately.

### 5.1.1 Male feeding

#### Daily amount of feed:

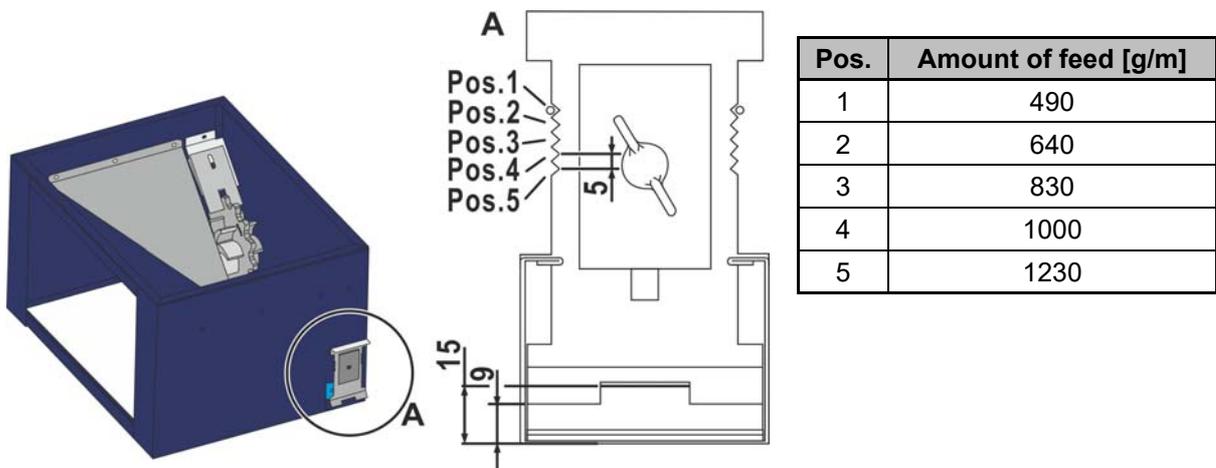
Due to the restricted feeding, only a certain amount of feed is available every day.

Recalculate this amount every day! For the calculation of these amounts please consult the production data of the birds, the determined animal weight as well as the age of the animals.

The daily feed quantity is normally exactly weighed in one or several day hoppers already the day before. It is not reasonable to weigh the daily feed quantity during the feeding since the eating speed of the birds exceeds the conveying capacity of many feed weighers by far.

In case of a destination feeding, a lot of small portions have to be weighed into the feed hoppers on the individual lines. When the supply is carried out via a day feed silo for all lines, the feed is filled in this hopper before the feeding starts. Only when all day feed hoppers for a house are filled with the provided amount, the feeding of the birds can be started.

#### Adjusting the chain feeding:



The diagram shows a blue feed hopper on the left and a technical cross-section on the right. The cross-section illustrates five adjustment positions (Pos. 1 to Pos. 5) for a feed chain. A hand is shown adjusting a screw at Pos. 4. Dimensions are indicated: 15 for the total height of the hopper, 9 for the height of the feed chain, and 5 for the distance between the adjustment screw and the feed chain. A table to the right lists the feed amounts for each position.

Pos.	Amount of feed [g/m]
1	490
2	640
3	830
4	1000
5	1230

**Feeding time:**

We recommend only to feed once a day. You can also feed more often; this reduces the feed quantity per feeding. However, this has got the following disadvantages:

- It cannot be guaranteed that the same quantity of feed is distributed at every eating place.
- The birds lose time which is required for the reproduction.

The feeding time can be freely selected, depending on the experiences of the customer. We recommend not to feed during the main laying phase. Because you would then lure the birds away from the nest. The main laying phase starts early in the morning and ends about noon. Therefore, feeding is often carried out very early in the morning or in the early afternoon. When selecting the correct feeding time, the conditions of each single farm have to be observed. Generally, the farm staff should attend the feeding so that they can eliminate failures immediately, if necessary. If the farm staff is on site only a long time have the light has been switched on, the feeding time should better be postponed to the afternoon.

The ventilation is also very important when choosing a feeding time. In hot climate zones it may be advantageous to feed early in the morning when the temperature outside and in the house is not too high. At hot days, a feeding in the afternoon can lead to an eating reluctance of the animals and thus, the feeding time is much protracted.

For the feeding it also applies that an electric fence device should not be used during the rearing period in order to avoid that the animals give up the jumping.

### **5.1.2 Male feeding**

The males are also fed restrictively. One male fertilizes approx. 10 hens. 10 hens lay approx. 1,800 to 1,900 eggs during the production period. If a male is not able to yield a good fertility rate due to his condition, this is a more serious problem than if a hen does not perform enough. Therefore, the "male management" is very important.

#### **Daily feed ration:**

In order to calculate the daily feed ration, you should consider the current condition, age and performance (fertility rate), as in case of hens. A male obtains less feed than a female. Since the daily feed ration is correspondingly low in relation to the low number of males in the house, the feed is directly weighed into the feed hoppers in the feed line. The distribution of the feed is carried out both automatically and in some farms also manually.

#### **Feeding time:**

Switch on the male feeding some minutes after having started the female feeding. This has the advantage that the females have already taken their place and do not try to get the feed of the male pan line. Moreover, no females are "locked up" between male pan line and outside wall of the house since the males block the way to the female feeding system. The male feeding is also carried out once a day.

### 5.1.3 After feeding

The feeding takes about one hour per day, depending on the age of the flock. After the feeding, the animals are thirsty and leave the litter to drink on the manure pit.

Raise the feeding systems of the animal area after feeding if these are suspended at the ceiling of the house.

By raising the feed lines you can create much more space in the house. This space is available for the hens for the rest of the day. The hens can use the lowered feeding systems to hide from the males and this can have a negative effect on the fertility rate.

The shadow which arises under the feeding system can tempt the males to build a nest there. The floor egg rate which thus increases has a negative effect on the total result.

## 5.2 Drinking system

Both round and nipple drinkers are used as described in chapter 3.2 "Drinking system". An optimal drinking water hygiene is essential to keep the flock healthy.

**It is absolutely necessary that the drinker lines are sterilized after each batch!** (=> chapter 7 "Hygiene, health and safety, cleaning and disinfection")

Protect the nipples of a nipple drinker against dirt!

Leaky nipples can occur due to foreign substances in the water. The following is very dangerous:

- Calcifications
- High ferric burden of the water
- Hardly dissolving medicines (e.g. in case of an overdose)
- All other solid matters which could be contained in the water
- Litter

Litter can intrude in the nipples when it is brought into the house.

=> Raise the nipple drinkers when distributing the litter material.

Regularly check and clean the filters of the water connecting units the service room. Normally, these filters are equipped with a reversible flow device. In case of some filters you have to open the cock so that the water pushes back and rinses possibly existing soiling out of the filter.

**i NOTICE!****The filters of the water connecting units must in no case be removed!**

Agglutinated medicines, calcium or ferric deposits can directly intrude in the nipple lines and, in an extreme case, even destroy the nipples.

- ▶ Iron particles in the raw water or deposits must be filtered out already in front of the water connecting unit.

Round drinkers with open water are exposed to dust in the air. Therefore, the round drinkers are to be cleaned several times a week.

When using round drinkers, the following should be observed:

- The animals have no problem to **adapt from nipple drinkers** in the rearing period to **open water** in the production period.
- The birds can **hardly adapt from open water** during the rearing phase to **nipple drinkers** in the production phase.

=> If the birds shall be supplied with water via nipple drinkers in the production period, you should use nipple drinkers in the rearing period as well.

In some regions, a wire is mounted (optionally) on the drinker line. This can be energised by means of an electric fencer.

**i NOTICE!**

Using current as anti-roost device is not allowed in some countries.

Do not use electric current in the rearing period! If the birds get an electric shock when they soar, they will no longer try to fly and will then have problems to reach the manure pits. The same applies to the feeding systems.

### 5.3 Raised slats / Slat level [rearing]

The slats or raised slats in rearing houses can be deposited outside the animal area at the beginning of the rearing period. The animals can only use them at an age of approx. 7 - 8 weeks.

Position the slats below the drinkers or lower them together with some drinker lines. At the first 2 - 3 days, the raised slats should be accessible for the birds together with the activated additional drinker lines.

After the animals got used to the system, you can start controlling the other drinkers via the drinker program. Since water is only available on the slats at certain times, the animals begin to stay on the slats on top.

During the following days, you can limit the water of the drinkers in the litter further in order to obtain a training effect with the animals. After the rearing period the animals already know that there are other higher slats and they do not need so much time to get used to jumping onto the manure pits. This has a positive effect on the floor egg rate in the production period since the animals can find the nest much easier.



Figure 5-1: Slats for the broiler breeder rearing

At the beginning of the production period, the turning bottom of the slats with turning bottom are turned into a vertical position.

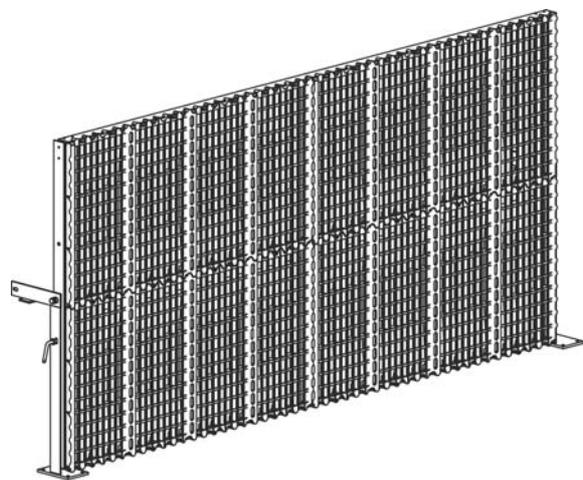
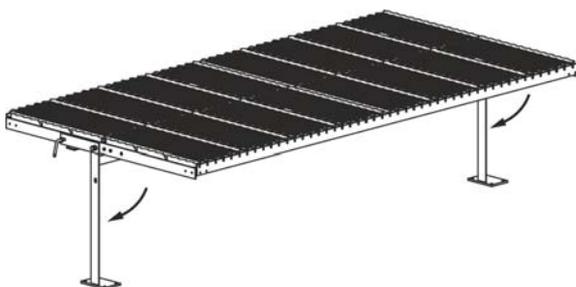


Figure 5-2: Slats with turning bottom

## 6 Maintenance

### 6.1 Procedure

- The nest should be checked at regular intervals for technical deficiencies, preferably in combination with the daily check-up on birds. If you discover increased wear on the system, the respective components immediately have to be repaired.
- Check the egg belt every day upon egg collection for correct operation. If you discover drifting, the belt has to be readjusted at the drive unit end. The idler roller at the back of the nest has to be checked for dirt at least twice a week. If there are feathers or manure in the roller, clean this while the egg belt is in standing position.
- The nest locking mechanism is operated by linear drives which are installed inside the nest above the egg channel. Check these drives and their seats at the square tube at regular intervals (at least approx. once a week). The operation of the locking mechanism has to be checked every day so that the hens do not have to wait in front of a closed nest in the morning.

### 6.2 Replacement of wear parts

#### **Nest insert:**

Nest inserts are wear parts and have to be checked for damages at regular intervals. Especially pitting by rodents can lead to a bad roll-off behaviour of the eggs. To avoid egg losses due to bad inserts replace those with extremely worn bristles.

Usually, nest inserts have a service life of 3 to 5 years. If cleaned regularly, with consistent pest control and good nest management a nest insert can also last longer.

#### **Plastic flooring:**

The plastic flooring on the manure pits can be damaged by dismantling, cleaning or in case of non designated use. Larger holes in the floorings can lead to injuries on the birds' feet. In extreme cases, damaged floorings can lose their stability. Therefore, check the floorings for damages upon check-up walks and replace them if necessary.

The following slats can be reordered from **Big Dutchman** :

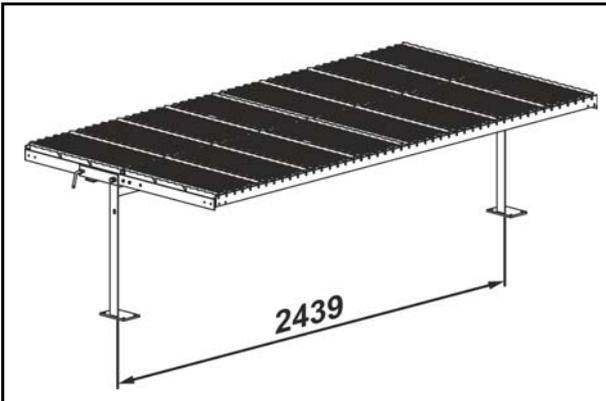


Figure 6-1: Standing slats with turning bottom

15-22-5420 Section 2439x1200 standing slats turning bottom

15-22-5425 End set standing slats turning bottom  
(additionally - if installed as single element)

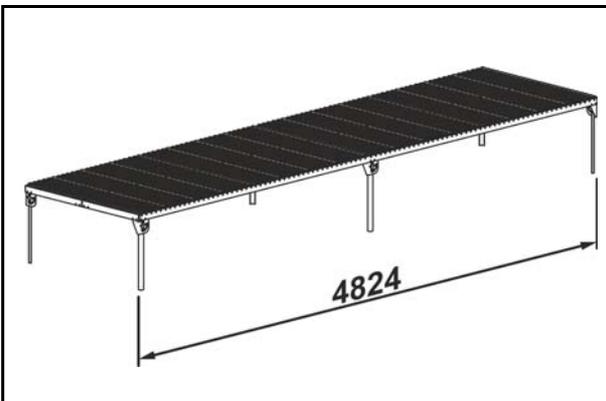


Figure 6-2: Standing slats 1200 wide, hoistable, hinged-type legs

15-22-5440 Section 4824x1200 standing slats, hoistable, hinged-type legs

15-22-5449 Additional section 2412x1200 standing slats, hoistable, hinged-type legs

15-22-5445 Endset standing slats 1200 wide, hoistable, hinged-type legs

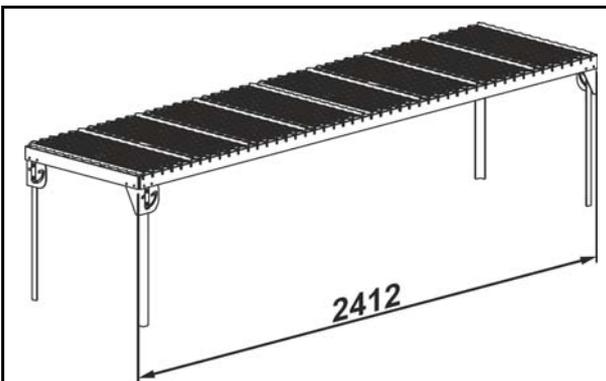
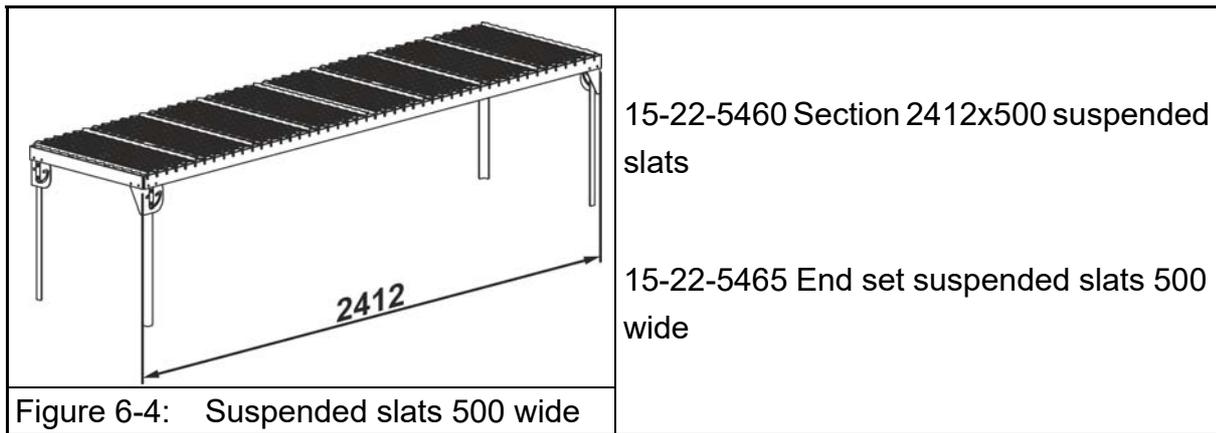


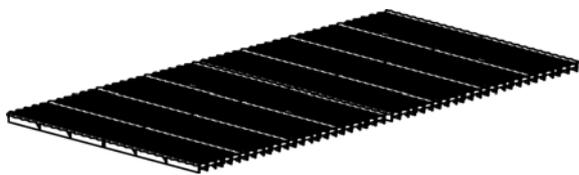
Figure 6-3: Standing slats 600 wide, hoistable, with hinged-type legs

15-22-5450 Section 2412x600 standing slats, hoistable, hinged-type legs

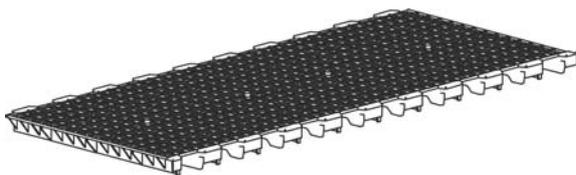
15-22-5455 End set standing slats 600 wide, hoistable, hinged-type legs



The slats can also be ordered as single parts:



83-00-1222 Plastic flooring 1K 1200x600



39-00-3329 Rod 8x1210 KB-R-2

## 7 Hygiene, health and safety, cleaning and disinfection

Different cleaning and disinfection measures can guarantee ideal hygiene on a farm.

### All measures have the following goals:

1. Reduce or eliminate contamination.
2. Prevent disease.
3. Create ideal conditions for high animal performance.

Since circumstances differ from farm to farm, **Big Dutchman** recommends the following measures to guarantee farm hygiene:

### 7.1 Hygiene measures for maintaining a high hygiene level

- The farm staff is not allowed to have contact to birds or other poultry outside of the farm!
- All vehicles should be disinfected before entering the farm. Install sprinkler hoses and wheel baths for the tyres at a place outside the farm!
- The farm should be fenced in! Only open the gate when required!
- No other poultry and birds may be on the farm!

Farms should always be safeguarded against invasion of wild birds, if possible! The buildings themselves must be protected against the invasion of birds of any kind (even the smallest oscine birds). This can be realised e.g. by installing bird screens in front of the ventilation openings.

- There should be no rodents on the farm! Draw up a plan for elimination and ensure that this plan is observed!
- Eliminate weed on the farm premises!
- No feed should left be open anywhere on the farm! Store feed in a dry place to which the animals have no access!
- The service room of every house should be equipped with hand sanitizer and disinfectant mats!
- All hygiene requirements should be complied with not only during the batch, but also during the entire service period!
- Keep the number of unnecessary visitors to the farm as low as possible. Upon entering the farm / the buildings, all visitors should put on protective clothing and write down their name in the visitors' log!

The farm should be equipped with a showering facility to change clothes and to prevent the introduction of germs!

## 7.2 Staff health and safety

**Big Dutchman** would like to remind you that for all methods used on the farm, including the hygiene program, the safety and well-being of your staff should always be carefully considered. For most countries, there are laws and or/provisions which should be complied with.

Do not forget to provide your staff with protective equipment required for the correct carrying out of their tasks.

### **The protective equipment includes:**

- protective clothing
- safety shoes
- protective mask, if necessary
- eye protection
- nose and mouth mask
- gloves

Be very careful when using disinfectants, especially gaseous agents, since many agents available on the market may be harmful for the staff.

- Shut off the power when cleaning live parts!
- Protect moisture-sensitive parts such as control cabinets and motors from splash water during wet cleaning by covering them!
- Water in combination with dust and feed remains can lead to slippery floors!
- Cleaning agents and disinfectants can cause corrosion! Observe the manufacturer's instructions!

## 7.3 Cleaning and disinfection

### 7.3.1 Comparison between wet and dry cleaning

The system may either be wet-cleaned or dry-cleaned. Wet cleaning allows for a more effective disinfecting process.

The system must be ventilated dry **immediately** after a wet cleaning. If the system is not dried and is damp for a very long time, rust may form and can damage the components.

Dry cleaning is the best option regarding a long service life of your system, but it may not be the right method for you. We learned from different customers worldwide that dry cleaning alone is not able to sufficiently reduce the number of germs, thus causing more diseases in the birds and in turn reducing the animal performance.

Wet cleaning removes biological substances and germs more efficiently from the system than dry cleaning.

If your program includes the use of disinfectants, you should also consider that biological substances might protect the germs.

The above mentioned points are caused by shorter and more frequent batches in broiler breeder rearing. Young birds with low immune systems are exposed to germs with originate from the last herd and which were not eliminated during the cleaning process. **Big Dutchman** recommends talking about the details with your veterinarian.

### 7.3.2 Service life of equipment

#### NOTICE!

If you use thermal disinfection, ensure that the temperature does not exceed 60°C. Temperatures above 60°C can damage the equipment in the house. **Specifically, plastics may deform.**

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**Big Dutchman** uses the best corrosion-free steel grades available on the market. In some models, specific parts, especially in critical areas of the system, are made of Galfan steel which provides the highest protection possible.

Still, it is common knowledge that some methods influence the product's service life negatively, independent of the quality of the corrosion protection and the supplier of the equipment. These unfavourable methods include:

- (a) wet cleaning of the components if they are not immediately dried afterwards;
- (b) high-pressure cleaning which may be more aggressive than normal cleaning, depending on the equipment and the duration of the cleaning process;
- (c) use of disinfectants which can damage steel or plastics and shorten the service life if they are used in high concentrations or longer than necessary.

These notes also refer to the building if this is made of coated steel.

#### NOTICE!

When choosing the disinfectant, you must pay attention to the corrosion resistance. Especially the disinfectants on acid basis tend to dissolve the zinc coat of galvanized components.

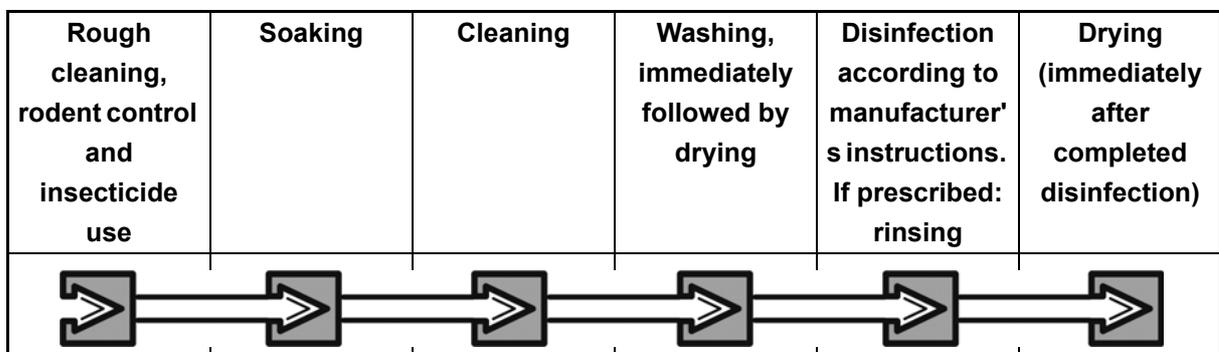
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### 7.3.3 Carrying out cleaning and disinfection

Cleaning must be carried out in a way that the surface structure, colour and original condition are clearly visible in every case.

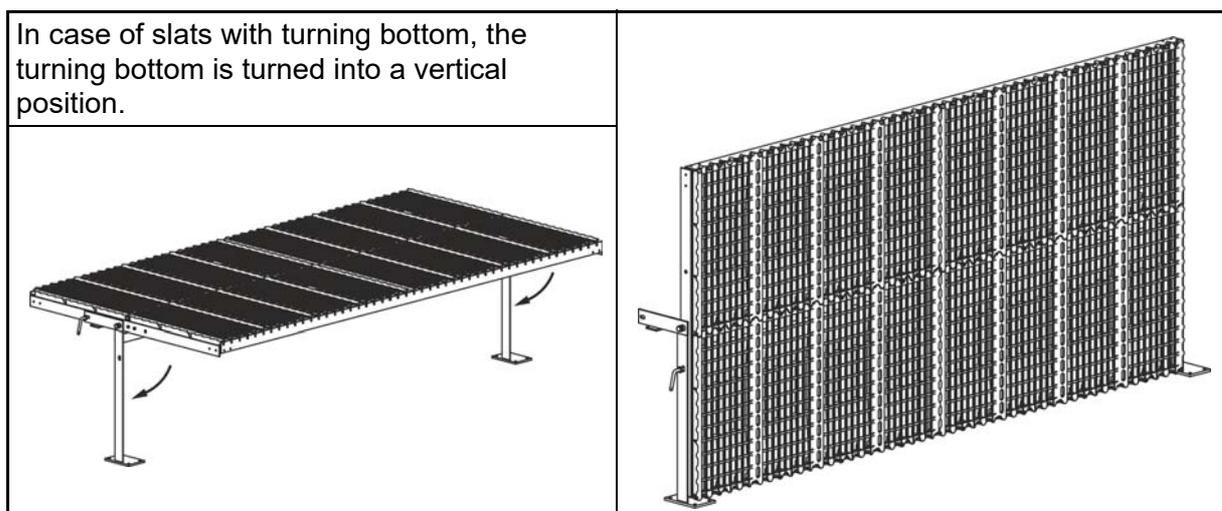
**The drinker lines must be sterilized after each batch!** A biofilm in the drinking system forms a culture medium for germs of all kinds. Moreover, a biofilm can store medicines dispensed via the water and deliver these to the animals at irregular intervals. This not only prevents a proper dispense of medicines but can, in an extreme case, lead to slaughtering of the birds charged with medicines. **Take measures to eliminate biofilms!**

#### 7.3.3.1 Basic procedure



#### 7.3.3.2 Before cleaning

The cleaning with a high-pressure cleaner must be carried out quickly and thoroughly. Raise the feeding system, drinker lines and slats, if necessary, to an optimal working height by means of a winch system. Fold up the feet at standing, liftable slats.



### 7.3.3.3 Primary cleaning, combating of rodents and applying insecticides

1. Before cleaning the house with water, feed rests and litter are to be removed both from the house and the equipment (Flex-Vey, chain feeding, etc.)

In order to clean the nest system, dismount the manure pits on both sides of the nest and bring them out of the house. The manure pit is usually cleaned separately outside the house and is only reinstalled at the end of the whole house cleaning.

2. Remove the dust from all equipment pieces and all places below the coverings!
3. Treat walls and ceilings with insecticides while the house is still warm.
  - A thorough cleaning and disinfection does not have any success if germs are distributed by flies over the freshly disinfected surfaces.
4. Kill off rodents (mice, rats) and arthropodes which can transmit and distribute germs of animal diseases!
5. All equipment which can be removed from the house should be taken outside.

### 7.3.3.4 Soaking

1. **Only if possible:** To make sure that the surfaces do not dry early during the following soaking procedure, both ventilation and heating should be switched off before starting with the soaking.
2. Soak the interior of the building, walls, ceilings and the residual equipment approx. 10 hours before the **wet cleaning**. Use fat- and protein-dissolving products.
  - **During soaking make sure that** sufficient liquid arrives on the dirt in order to dissolve the dried dirt layer.
3. Avoid a re-drying of the dirt until the wet cleaning is started.

#### NOTICE!

**Thorough soaking can reduce the duration of the following cleaning period considerably.**

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### 7.3.3.5 Wet cleaning

After having dismounted the manure pit, the litter and manure must be removed from the house. Clean everything with a high-pressure cleaner after a rough mechanical cleaning.

The nest system itself should be cleaned as gently as possible by means of a high-pressure cleaner. It is important that a minimum distance of at least 30 cm (depending on the power of the cleaner) is observed.

Electronic parts as for example the linear drive for the expel system should be handled with special care. The drive has protection class IP 55 and is therefore protected against splash water. Still we recommend dry cleaning with subsequent disinfection. The daily opening and closing of the nest should also be carried out then in order to avoid that the drives "jam" during the cleaning period. The egg belt should also run regularly.

Running the empty chain feeding system is not advisable since there is no greasing through the feed in an empty state.

Silos and feed carts should be cleaned as well. Observe the notes in the respective manual when cleaning feed carts.

After the cleaning, you should grease or lubricate those components which are running regularly and which can possibly wear out.

For the wet cleaning, the pans should remain closed during the cleaning process so that they can swing under the pressure of the water jet. After the high-pressure cleaning, the pans should be opened so that the water can drain off.

1. Clean the house with pressure washers, starting with the ceiling and working down to the floor, paying particular attention to ventilation elements, pipelines, edges and top surfaces of beams.
2. Make sure the house is well lit during the cleaning operation so that dirt is clearly visible.
3. Dirty drinkers and water tanks are potential hazards and should therefore be cleaned and disinfected (see also chapter 7.3.3.7 "Disinfection").
4. Any furniture taken outside and the exterior of the building, including outdoor concreted areas, should also be washed down.
5. Keep in mind that some parts of the system and building must not be cleaned with water, as e.g. electrical motors, electrical control panels as well as everything that could be damaged by water.
6. The **Big Dutchman** motors are designed for gentle cleaning, however not for high-pressure cleaning.

 **NOTICE!**

**The cleaning process has been successfully finished when all cleaned parts are visually clean and the drained off water is free from dirt particles.**

### 7.3.3.6 Rinsing and drying

1. After washing it is advisable to rinse the surfaces and equipment with clean water to remove residues of cleaning agents.
2. Rinse the house starting with the ceiling and working down to the floor.
3. Ventilate the house thoroughly after having completed the cleaning so that it can dry quickly.
  - **Remove water accumulations which cannot dry fast enough by hand!**
4. Oil all the chain wheels, roller chains and rust-sensitive parts again.
5. After cleaning, carry out necessary repair and maintenance works.

#### NOTICE!

**A thorough and careful house cleaning is an imperative precondition for a successful house disinfection!**

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### 7.3.3.7 Disinfection

Many hygiene programs all over the world demand the use of disinfectants after the cleaning process. You should however keep in mind that many disinfectants may reduce the service life of your installation.

**For the choice of the correct disinfectant, please observe the following:**

- Could the disinfectant endanger the **health** of persons?
  - Take all necessary measures (e.g. protective clothing, gloves and respiratory equipment, etc.) to exclude any dangers for the persons handling the disinfectants!
- Which **infectious agents** can be combated with it?
  - In case of doubt please contact your veterinarian.
- For which **temperature range** is the disinfectant provided?
  - If the disinfectant is used at temperatures other than those specified, the efficacy of the agent will be reduced.
- Is the disinfectant appropriate for the treatment of **galvanized steel**?
  - Unsuitable disinfectants can lead to corrosion of the steel and destroy it!
- Is the disinfectant appropriate for the treatment of **plastics**?
  - Unsuitable disinfectants can destroy plastics!
- Is the disinfectant appropriate for the treatment **of other materials existing in your house**?
  - Unsuitable disinfectants can destroy these materials.

#### NOTICE!

**The instruction leaflet and/or packing or the safety data sheet of the manufacturer will provide you with information regarding the protection of persons handling the disinfectant and regarding the resistance of various materials to the disinfectant.**

In any case, you should weigh up the advantages and disadvantages for each single component of your system when you decide to use a disinfectant.

Please also consider its involvement in the entire process of your hygiene program.

**Disinfection procedure:**

**i NOTICE!**

If you use thermal disinfection, ensure that the temperature does not exceed 60°C.

Temperatures above 60°C can damage the equipment in the house. **Specifically, plastics may deform.**

An equipment like the Augermatic feed line is normally installed in a nearly airtight building. This allows the use of gaseous substances which eliminate germs. This is a method quite common in some parts of the world.

**Below you will find a description of a wet disinfection:**

1. Please consider and observe the usage recommendations of the manufacturer regarding concentration, soaking time, admissible ambient temperature, temperature of the components to be disinfected and quantity of the disinfectant solution!
2. Take all measures (e.g. protective clothing, gloves and respiratory equipment, etc.) to exclude any dangers for the persons handling the disinfectants!
3. **Important:** Never mix several disinfectants since the single active agents can cancel each other and moreover new explosive connections could form.
4. The surfaces and objects to be disinfected must be clean and dry!
  - Residual moisture or puddles in the house can lead to a dilution of the disinfectant and thus to a reduction of the efficacy. Consequently, more disinfectants must be applied in order to achieve an optimal result.
5. The disinfectant is applied starting in the back of the house and working to the front respectively starting with the ceiling and working down to the floor.
6. When applying the disinfectant make sure that the surfaces are completely moistened.
  - This working solution should be applied with max. 10 to 12 bar working pressure and reduced conveying capacity since otherwise aerosols will develop and the wetting properties change.
7. During the soaking time, the ventilation system should be switched off if possible in order to avoid that the surfaces dry up too fast.
  - **The treated houses may only be entered with a respirator mask for a certain time, depending on the method of applying, soaking time and active agent.**
8. The disinfected surfaces and objects should be rinsed thoroughly if the specifications of the disinfectant manufacturer demand this.

**i NOTICE!**

The feeding and drinker systems however must **always** be rinsed thoroughly after the disinfection.

**Drinker lines** must **always** be rinsed on the **inside** after completed disinfection. In case the soaking time is too long, the drinking nipples may become leaky. Chlorous disinfectants are to be regarded as especially critically in this connection.

All residues of the disinfectant should therefore be removed.

**Checking the disinfection results:**

Appropriate steps should be taken to check the efficiency of the disinfection.

1. Take adhesive film tests and swab samples of housing equipment and surfaces!
  - The total number of germs / cm<sup>2</sup> is determined with these tests. It should be below 1000 CFU (= colony forming units).

**i NOTICE!**

If the germ presence is determined to be too high following cleaning and disinfection, the above measures are to be repeated and the moving a new batch in is to be postponed.

**7.3.3.8 Drying after a complete and successful wet disinfection procedure**

The system must be ventilated dry **immediately** after a complete and successful wet disinfection procedure.

If the system is not dried and is damp for a very long time, rust can form and thus damage the components.

## 8 Management errors and their effects

Management error	=>	Effect
The initial filling of the feeding takes too long > 3 minutes	=>	The uniformity of the flock decreases
The drinker lines are suspended too deep	=>	Wet litter / bad health of foot pads
Light is too bright during the rearing phase	=>	Beginning of laying is irregular and late
Sexually mature males are moved in with the hens too early	=>	Fertility rate is too bad
Too small number of males	=>	
Too large number of males	=>	
Litter too deep	=>	The number of floor eggs increases
The floor eggs are collected too rarely	=>	
Nest is not opened early enough	=>	
Lighting in the house allows shadow cast	=>	
Ventilation is poorly adjusted	=>	
Nest is closed too late	=>	The rate of dirty egg increases
Nest mats are badly soiled	=>	
The transfer units at the egg belt are improperly mounted	=>	The rate of cracked eggs increases

## 9 Further reading

### 9.1 Internet websites

**Cobb Breeder Management Guide:**

<https://www.cobb-vantress.com/resource/management-guides>

**Hubbard Management:**

<https://www.hubbardbreeders.com/documentation/recherchedocumenttheque.html>

**Ross Management:**

<http://en.aviagen.com/tech-center/>

### 9.2 Books

Hühnersignale; Rootbont Publishers B.V.; February 2010; ISBN 978-90-8740-065-1