



# BTSF Better Training for Safer Food *Initiative*

Animal welfare in poultry production (chickens kept for meat production) – IV Session

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*BTSF*

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## Risk factors affecting the welfare of broiler chickens on farm: light intensity and lightning regime

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# BTSF Regulation animal welfare poultry

- **Council Directive 2007/43/EC** laying down minimum rules for the protection of chickens kept for meat production – this Directive is often in everyday talk referred to as the broiler Directive, and chickens kept for meat production are in everyday talk referred to as broilers. The term broilers will be used in this e-learning
- **Council Directive 98/58/EC** concerning the protection of animals kept for farming purposes
- **Council Regulation (EC) No 1099/2009** on the protection of animals at the time of killing – this Regulation is often in everyday speech referred to as the killing Regulation
- **Regulation (EU) No 2017/625** of the European Parliament and of the Council on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products – this regulation is often in everyday talk referred to as the Official Controls Regulation
- Commission Implementing **Regulation (EU) No 2019/627** laying down uniform practical arrangements for the performance of official controls on products of animal origin intended for human consumption in accordance with Regulation (EU) No 2017/625 of the European Parliament and of the Council and amending Commission Regulation (EC) No 2074/2005 as regards official controls

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## Light intensity

- The broiler Directive establishes that all buildings shall have lighting with an intensity of **at least 20 lux** during the lighting periods, measured at bird eye level and illuminating at **least 80 % of the use-able area.**





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## Light intensity

- The light intensity should be uniformly distributed throughout the house. It must be measured at eye level of the broilers, and the measurements should be taken in three different places of the house to ensure a uniform light intensity throughout the house



# BTSF Consequences of bad illumination

- A temporary reduction in the lighting level may be allowed, when necessary, following veterinary advice. This is only allowed on a temporary basis and only after veterinary advice, because a low daytime light intensity, below 5 lux, may have a negative impact on mortality, feed conversion ratio and growth.

Low light intensities may also:

- Affect eye growth.
- Lead to increased foot-pad dermatitis.
- Reduce activity and comfort behaviors, such as dust bathing and scratching.
- Have an impact on the physiological rhythms, as birds may not be able to detect difference between day and night.



- Lighting and how it is managed with hours of lightness and darkness, and how light is distributed throughout the day, can impact both broiler productivity and welfare. Broilers benefit from having a defined regime of lightness and darkness, creating distinct periods for activity and rest.

Examples of light sources that can be used in the broiler house



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- To attain a state of night-time darkness, the light intensity should be less than 0.4 lux. During dark-ness, care should be taken to avoid light seepage through air inlets, fan casings and door frames

### 5.4 Lighting Programs

**L**ighting programs are a key factor for good broiler performance and flock welfare. Lighting programs are typically designed with changes occurring at predetermined ages and tend to vary according to the final target market weight of the broilers. Research indicates that lighting programs which include 6 hours of continuous darkness will improve the development of the immune system.

One standard lighting program will not be successful for all parts of the world. Therefore, the lighting program recommendations listed in this guide should be customized based on the environmental conditions, house type and overall stockman objectives. Lighting programs inappropriately employed may impair average daily gain (ADG) and compromise flock performance and reduce welfare. Careful observations of flock performance, nutrient density and feed and water intake are also important in designing lighting programs. Accurate ADG information is needed to optimize a lighting program.



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## Lighting programs

- Lighting programs should be simple in design and easy to implement. In any case, the lighting program must comply with the provisions of Directive 2007/43/EC, which requires that within seven days from the time when the chickens are placed in the building and until three days before the foreseen time of slaughter, the lighting regime must follow a 24-hour rhythm and include periods of darkness lasting at least six hours in total, with at least one uninterrupted period of darkness of at least four hours, excluding dimming periods

The intensity and distribution of light alters broiler activity. Correct stimulation of activity during the first 5-7 days of age is necessary for optimal feed consumption, digestive and immune system development and good welfare. Lighting programs can be adjusted to improve feed efficiency.

Uniform distribution of light throughout the house is essential to the success of any broiler lighting program:

- Light intensity - 25 lux (2.5 foot-candles) in the darkest part of the house, as measured at chick height, should be the minimum used during brooding to encourage early feed intake and early weight gains.
- Light intensity should not vary more than 20% from brightest to darkest place at floor level.
- After 7 days of age, or at 130 - 180 g body weight, light intensities can be reduced gradually to 5-10 lux (0.5-1 fc) unless local legislation prohibits this reduction. See lighting programs section for more details.



Local government legislation may affect the lighting program that can be used. All operations must comply fully with local animal welfare regulations.

**Note:** Lowering light intensity below 5 lux during the growing phase to improve feed conversion ratio (FCR), risks the reduction of daily feed consumption and a decrease in the average daily gain.



The **four important** components to a lighting regime are:

- Photoperiod length, which is the number of hours of lightness and darkness given in a 24-hour period.
- Photoperiod distribution, which is how the hours of lightness and darkness are distributed throughout a 24-hour period.
- Wavelength, which describes the colour of the light.
- Light Intensity, which describes how bright the light provided is.

## Key Points to Consider When Using a Lighting Program

- Test any lighting program before making it firm policy.
- Provide 24 hours light on the first day of placement to ensure adequate feed and water intake, and to encourage chick activity within the brooding area.
- Turn the lights **off** on the second night to establish when the **off** time will be. Once set, this time must never change for the life of the birds.
- Once the switch **off** time has been established for the flock, any adjustment should be by adjusting the **on** time only. Birds soon get used to when the **off** time is approaching and will 'crop-up' and drink before the lights go **off**.
- Use a single block of darkness in each 24-hour period.
- Start increasing the dark period when the birds reach **130-180 g**.
- If partial house brooding is practiced, delay dimming until the full house is utilized.
- Allow the birds to feed ad libitum to ensure they go into the dark period full of feed and water and can eat and drink immediately when the lights turn back on. This helps prevent dehydration and reduces stress.
- As much as is possible, the darkness should be provided at night to ensure the dark periods are truly dark.
- Inspection of the flock should take place during the day when there is adequate light available inside the bird area and the flock is active.
- The birds should be weighed at least weekly and on days that the lighting program is scheduled to be adjusted. The lighting program should be adjusted according to the average weight of the birds. Past experience of a particular farm's performance should also be considered.
- The length of the dark period should be increased in **steps** and **not** in gradual hourly increases (see programs).
- Reducing the dark period before catching reduces 'flightiness.'
- If progressive thinning is practiced it is good policy to reintroduce 6 hours darkness the first night after depopulation.
- Reduce the darkness in times of warm weather if the birds are being stressed during the day and feed intake has been reduced.
- In **winter time**, especially in cold climates, coincide the **off time** with dusk so the birds are awake during the coldest part of the night.
- In the **summer time** the **on time** should coincide with sunrise to encourage feed intake before the peak heat of the day.
- Make sure that there are no drafts or wet litter at the end of the house where demand pans are installed. This could result in empty feeding systems leading to panic and scratching when lights are switched on.
- Do not turn the feed and water off during the dark period.
- If possible, use a dawn to dusk dimming system to prepare the birds for the on/off periods.
- Broiler farmers with clear curtain housing have limited alternatives. They need to design their lighting programs to coincide with natural daylight.
- 48 hours prior to catch, increase light intensity to 10/20 lux to acclimate the birds to catching - only if daylight catching is practiced!

- The interactive effects of these factors need to be taken into account, when deciding on a lighting regime for broilers.
- Lighting regime benefits are:
  - A period of darkness is a natural requirement for all animals.
  - Energy is conserved during resting, leading to an improvement of the feed conversion rate.
  - Mortality and skeletal defects are reduced.
  - The light and dark periods increase melatonin production, which is important for immune system development.
  - Bird uniformity is improved,
  - Birds with an adequate dark and therefore rest period have a calmer behaviour and fewer tendencies to crowding that would result in scratches and lesions



- As a guideline for good management practice the lighting regime for broilers should be:
- From 0-7 days of age, where legislation does not require a period of darkness, it is recommended that chicks should have 23 hours' light and 1 hour of darkness
- After 7 days and until three days before slaughter, legislation requires a continuous period of at least 4 hours of darkness, but 6 hours of continuous darkness would be beneficial. The total period of darkness must be minimum 6 hours in total during a 24-hour period
- Changes of lighting programs should be made over a period of 2-3 days.
- Intermittent lighting programs should be simple, providing at least one continuous block period of 4 hours' darkness.



## Examples of Four Lighting Programs

### Standard Lighting program - Option 1

- Slaughter weight: <2.5 kg (5.5 lb)

Age days	Hours dark	Hours change
0	0	0
1	1	1
<b>130-180 g</b>	<b>6</b>	<b>5</b>
Five days before kill	5	1
Four days before kill	4	1
Three days before kill	3	1
Two days before kill	2	1
One day before kill	1	1

### Standard Lighting program - Option 2

- Slaughter weight: <2.5 kg (5.5 lb)

Age days	Hours dark	Hours change
0	0	0
1	1	1
<b>130-180 g</b>	<b>6</b>	<b>5</b>
21	5	1
28	4	1
35	3	1
Two days before kill	2	1
One day before kill	1	1

### Standard Lighting program - Option 3

- Slaughter weight: 2.5 kg - 3.0 kg (5.5 - 6.6 lb)

Age days	Hours dark	Hours change
0	0	0
1	1	1
<b>130-180 g</b>	<b>8</b>	<b>7</b>
21	7	1
28	6	1
35	5	1
42	4	1
49	3	1
Three days before kill	3	1
Two days before kill	2	1
One day before kill	1	1

### Standard Lighting program - Option 4

- Slaughter weight: >3.0 kg (6.6 lb)

Age days	Hours dark	Hours change
0	0	0
1	1	1
<b>130-180 g</b>	<b>10</b>	<b>9</b>
22	9	1
28	8	1
35	7	1
42	6	1
49	5	1
Five days before kill	5	0
Four days before kill	4	1
Three days before kill	3	1
Two days before kill	2	1
One day before kill	1	1

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## Thank you

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