



## LIGHTING FOR POULTRY HOUSING

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Light levels (intensity or illuminance) and the duration of light (photo period) are important factors in poultry production. Intensity has an effect on cannibalism and aggression, along with feed and water intake, while photo period influences reproductive and egg production cycles, total feed intake, and growth rate.

Light intensity at the working plane (bird level, egg collection table, work-bench level, etc.) is measured in lux or foot-candles (10 lux equals about one foot-candle). Typical light levels found in broiler and layer operations are about 10 to 20 lux (1 to 2 foot-candles), while a bright sunny day in mid-summer is about 80,000 lux (8,000 foot-candles). Typical light levels on the surface of an office desk might be 400 to 500 lux (40 to 50 foot-candles).

Variation of the photo period is used to stimulate egg production in pullet flocks for both breeding and commercial layers. In broilers (chickens and turkeys), several different lighting programs are being studied to help improve skeletal development through feed intake. All lighting programs that use more hours of darkness than the hours of darkness during natural day length require light traps on fans and air inlets (see CPS leaflet "Light Restricting Fan Houses and Inlets").

The following tables provide some of the most common lighting programs for different types of poultry operations.

**Table 1 Lighting Programs for Commercial Layers**

Lighting Options	Flock Age	Light Intensity lux (foot-candles)	Photo Period (hours of light per day)	
Option 1	<b>Pullets</b>			
	Brooding (1 - 3 days)	20 (2)	23	
	Growing (4 days - 19 weeks)	5 (0.5)	9 to 11	
	Laying (20 - 72 weeks)	10 - 30 (1 - 3)	Increase by ½ hour per week to maximum of 16 - 17 hours.	
Option 2	<b>Pullets</b>			
	Brooding (1 - 3 days)	20 (2)	23	
	Growing:	(4 days - 2 weeks)	5 (0.5)	23
		(2 - 3 weeks)	5 (0.5)	21
		(3 - 4 weeks)	5 (0.5)	19
		(4 - 5 weeks)	5 (0.5)	17
		(5 - 6 weeks)	5 (0.5)	15
		(6 - 7 weeks)	5 (0.5)	13
		(8 - 9 weeks)	5 (0.5)	11
(9 - 20 weeks)	5 (0.5)	11		
Laying (20 - 72 weeks)	10 - 30 (1 - 3)	Increase by ½ hour per week to maximum of 16 - 17 hours.		



**Table 2 Lighting Programs for Breeders (broiler and commercial layers)**

Lighting Options	Flock Age	Light Intensity lux (foot-candles)	Photo Period (hours of light per day)
Option 1	<b>Pullets</b>		
	Brooding (1 - 4 days)	20 (2)	23
	Growing: (4 days - 3 weeks)	5 (0.5)	15
	(3 -19 weeks)	5 (0.5)	11
Laying (20 - 60 weeks)	50 - 60 (5 - 6)		Increase by ½ hour per week to maximum of 17 hours.

**Table 3 Lighting Programs for Broilers/Roasters**

Lighting Options	Flock Age	Light Intensity lux (foot-candles)	Photo Period (hours of light per day)
Option 1	Brooding (1 - 2 days)	20 (2)	23
	Growing (2 days - market)	5 (0.5)	23
Option 2	Brooding (1 - 3 days)	20 (2)	23
	Growing: (3 - 10 days)	5 (0.5)	8
	(10 - 15 weeks)	5 (0.5)	12
	(15 - 21 weeks)	5 (0.5)	16
	(21 - 35 weeks)	5 (0.5)	18
	(35 - 42 weeks)	5 (0.5)	23
Option 3	Brooding (1 - 3 days)	20 (2)	23
	Growing (3 days to market)	5 (0.5)	16
Option 4	Brooding (1 - 3 days)	20 (2)	23
	Growing: (3 - 10 days)	20 (2)	18
	(10 - 15 days)	5 (0.5)	8
	(15 - 21 days)	5 (0.5)	12
	(21 - 28 days)	5 (0.5)	16
	(28 - 42 days)	5 (0.5)	18

**Table 4 Lighting Programs for Turkeys**

Lighting Options	Flock Age	Light Intensity lux (foot-candles)	Photo Period (hours of light per day)
Option 1	Brooding (1 - 3 days)	50 (5)	23
	Growing (3 days - market)	5 - 10 (0.5 - 1)	23
Option 2	Brooding (1 - 3 days)	50 (5)	23
	Growing: (3 days - 8 weeks)	5 - 10 (0.5 - 1)	2.5 L : 3.5 D
	(8 - 12 weeks)	5 - 10 (0.5 - 1))	2.5 L : 2.5 D

**Table 5 Lighting Programs for Other Functions**

Other Functions	Light Intensity lux (foot-candles)
Feed Storage/Processing	100 - 200 (10 - 20)
Barn Inspection/Cleaning	50 (5)
Egg Handling	500 (50)
Egg Processing	700 - 1000 (70 - 100)
Office (desk surface)	400 - 500 (40 - 50)
Shop (rough bench work)	500 (50)
Shop (detailed bench work)	1000 (100)

Light intensity is affected by many variables: lamp type (i.e., incandescent versus fluorescent, versus high pressure sodium, versus metal halide, versus low pressure sodium, etc.); reflectance of the floor, walls, ceiling; height of the lamp fixture above the working plane; dirty conditions, and maintenance schedule.

Table 6 gives some typical spacings of incandescent and fluorescent light fixtures for a typical set of poultry barn conditions.

**Table 6 Fixture Spacings**

Lighting Level	Recommended Fixture Spacing (ft.) (in row and between row)		
	Incandescent		Fluorescent
	100 W	150 W	2 - 40 watt, 48" fixtures
50 lux (5 ft-candles) <sup>(1)</sup>	9'	12'	16'
100 lux (10 ft-candles) <sup>(2)</sup>	8'	10'	14'
500 lux (50 ft-candles) <sup>(2)</sup>	4'	5'	7'
750 lux (75 ft-candles) <sup>(3)</sup>	4'	5'	7'
1000 lux(100 ft-candles) <sup>(3)</sup>	3'	4'	6'

Note: (1) Based on rooms with 10' heights to work plane with relatively dirty, dull walls, ceiling and floors.

(2) Based on rooms with 7' heights to work plane with relatively bright walls, ceiling and floors.

(3) Based on small areas with 4' height to work plane with bright reflective shrouds, and relatively bright walls and work surfaces. For specific tasks such as detailed work bench, egg processing.

Total light source output is measured in "lumens" (lumens per area is equal to foot-candles or lux). The efficiency of a light source is measured in lumens per watt. Table 7 gives a comparison of light sources and their efficiencies.

**Table 7 Light Sources and Their Efficiencies**

Lamp Type	Efficiency Lumens per Watt
Incandescent	10 - 20
Mercury Vapour	20 - 60
Fluorescent	40 - 100
Metal Halide	50 - 110
High Pressure Sodium	50 - 140

Incandescent or fluorescent fixtures are the most common in poultry facilities. The other types are classified as high-intensity discharge, and although they are more efficient, they are better suited for ceiling heights over 12 feet, and in some cases have poor colour rendition.

Lights in all poultry production facilities should be dimmable in order to achieve the desired light intensity. This is usually accomplished by a manual or computerized rheostat. Another option might be to have several separate lighting circuits that can be turned on or off to achieve different light levels. The light circuitry must also be on a timer to regulate photo period.