

Lighting Alternatives For The Broiler Industry

Lighting Fundamentals

Adequate and appropriate light is essential for chick growth and maturation. Growth, behavior and reproduction of the chick are all affected by daylength, light intensity and wavelength (color) of light. The sun's natural daylight is an ideal light source for the chick. Due to nature's seasons and certain environmental housing types, supplemental

lighting is used in nearly all modern broiler houses today.

In the broiler industry, chicks are usually brooded for a 1 week period with 23 hours of supplemental light. Thereafter, artificial light is provided only from dusk to dawn (an average of 12 hours). Light intensity is often higher during the brood period to stimulate initial chick activity. During

growout the light is then modified to prevent too aggressive behavior. Ideal light color is in the warm white range (orange-red) which provides adequate stimulation versus a cool white range (blue-green), which encourages inactivity and slower sexual maturity in chickens.

Fluorescent Versus Incandescent

Development of a compact fluorescent lamp which can be used in a common light bulb socket has become a viable alternative to the standard incandescent bulb. The primary advantages of compact fluorescent lamps are that they have a higher lumen output per watt of electricity used as well as a longer lamp life in comparison to an incandescent bulb.

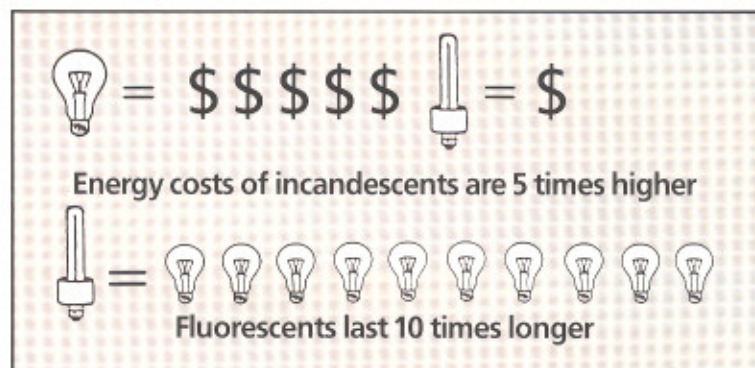
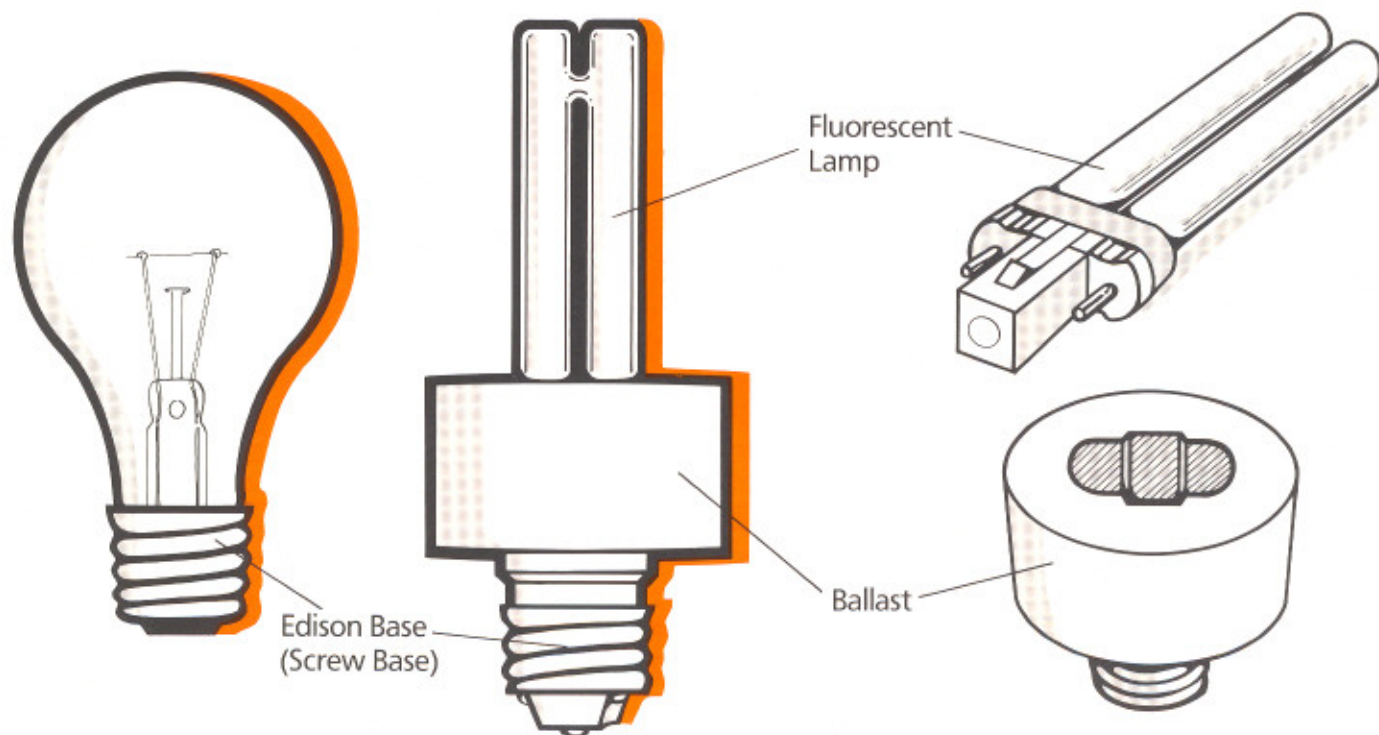


Figure 1: Advantages and Disadvantages of Lighting Alternatives



Compact fluorescent lamps emit color in the yellow-green, orange-red, and red wavelengths, which is comparable to incandescent lamps with visible color mostly in the orange-red wavelength. The disadvantage of fluorescent lamps is the higher initial costs. Incandescent lamps also generate more heat/lumen than fluorescent lamps. This could be either an advantage or disadvantage depending on the situation. However, an incandescent lamp is a very inefficient source of heat for poultry houses.

A comparison of incandescent versus compact fluorescent lamp output (lumen) is given in Table 1.

TABLE 1: Matching Output of Incandescent Versus Compact Fluorescent Lamps

INCANDESCENT LAMP	COMPACT FLUORESCENT LAMP EQUIVALENT	INITIAL LIGHT OUTPUT* (LUMENS)
25-WATT	5-WATT	THE SAME
40-WATT	7-WATT	20% LESS
40-WATT	9-WATT	20% MORE
60-WATT	13-WATT	THE SAME
75-WATT	18-WATT	6% LESS
100-WATT	TWO 13-WATT	THE SAME

*Fluorescent light output diminishes with age. Near the end of life they may provide only 70 to 80% of initial output.

Field Test Results

Several field trials have been conducted to test the use of compact fluorescent versus incandescent lighting in commercial broiler houses. Various parameters monitored included: mortality, bird growth, feed conversion, kilowatts of electric-

ity used and lighting costs. The results of these trials are shown in Table 2. No differences were measured between fluorescent versus incandescent for mortality, average body weights or feed conversion. However, the amount of electricity used for

lighting and lighting costs were considerably less for the houses with fluorescent lighting. The least expensive lighting was the 5-watt compact fluorescent lamps.

TABLE 2: Field Test Results — Compact Fluorescent Versus Incandescent Lighting

	Mortality	Average Bird Wt.	Feed Conversion	Kilowatts of Elect. used/house for Light.	Lighting Costs (at \$.07/Kwh)
SITE 1: Incandescent (100 watt brood and 15 watt grow-out)	3.19%	3.79 lbs	1.741	746	\$52.22
VS. Fluorescent (2x9 watt brood and 9 watt growout)	3.08	3.76	1.704	370	\$25.90
SITE 2: Incandescent (100 watt brood and 15 watt grow-out)	5.28	3.77	1.813	620	\$43.40
VS. Fluorescent (2x5 watt brood and 5 watt grow-out)	5.39	3.74	1.793	200	\$14.00

Economic Feasibility

Table 3 is an example of the amount of time required to pay-back the initial cost of changing a typical broiler house from incandescent lighting (40 watt lamps) to compact fluorescent lights (9 watt lamps). With a cost of \$10.00 per fluorescent lamp and a \$0.08/Kwh electric charge, it would take only one year to pay-back the initial lamp costs and thereafter, the grower will save \$535.85/year in electric bills, (less the costs of replacing faulty lamps).

Thus, the grower must consider their specific situation and the economic feasibility of using compact fluorescent lamps versus incandescent bulbs. Considerable electric savings are attainable in most poultry housing situations today.

TABLE 3: Payback Period (years)* of Incandescent (40 watt) Versus Fluorescent Lighting (9 watts)

SITUATION: One 40 x 400 ft. broiler house with 2 lines of light sockets every 12 ft. (total of 66 lamps). ■ Brooding chamber has 22 bulbs (used 1st week of growing period) ■ 6½ Flocks reared/year ■ Photo-period of Brood Period (1 week)- 23 hours lights on/1 hour lights off ■ Growout Period (5½ weeks)-12 hours lights on/12 hours lights off

\$ Cost/Fixture	ELECTRICAL COSTS (\$/Kwh)		
	.06	.08	.10
\$ 6.00	.70	.50	.40
\$ 8.00	1.00	.75	.60
\$10.00	1.35	1.00	.80
\$12.00	1.70	1.25	1.00
Yearly Savings After Payback	\$401.80	\$535.85	\$669.81

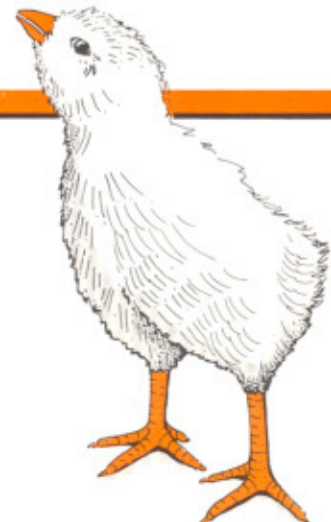
*Years to payback calculated as time required to pay for initial cost of compact fluorescent tubes versus incandescent bulb cost with electricity savings. Costs of incandescent (2500 hr) lamps estimated at 90¢/2500 hr bulb.

For Further Information

To obtain additional information on using fluorescent lights in broiler houses, contact:

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- Your local Agricultural Extension Service agent
- Vendors of fluorescent lighting products





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