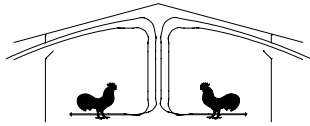




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Poultry Housing Tips

Light Dimmers and Electricity Usage

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Do dimmers reduce electricity usage as you reduce light levels in your house? In short, yes. Modern electronic dimmers reduce light output by electronically reducing the voltage going to the light bulbs. As you turn down the dimmer, the voltage going to the bulbs is reduced, which in turn reduces both light intensity and power usage. This was not always the case. Before the invention of the electronic dimmer, many many years ago, rheostat dimmers were used by a few people. With rheostat dimmers, power usage was not decreased as light intensity was reduced. But, don't worry, all dimmers in poultry houses today are of the electronic type.

Many growers have questions related to how light bulb power usage changes as light intensity is reduced by electronic dimmers. For instance, does reducing the setting on your dimmer from a ten to a five reduce your power usage in half? Or, "does dimming a 100 watt light bulb down to the equivalent of a 25 watt bulb reduce power usage to that of a 25 watt light bulb?"

Recently laboratory tests were conducted to determine the relationships between dimmer settings, light intensity and power usage. The power usage, and relative light intensity of 100, 75, 60, 40 and 25 watt standard light bulbs controlled by a popular poultry house light dimmer (ProTech, 8K Gold) were measured. From these tests, charts were developed showing the relative light output and total power usage of the different light bulbs (and dimmer) at various dimmer settings (electricity cost = 8 cents per Kw*hr).

From these tests it was determined that the dimmer itself used a negligible amount of power at any setting. This does not mean that there was not a loss of lighting efficiency as the bulbs were dimmed. A light bulb is tuned to produce the most amount of light at a specific voltage. As the voltage is decreased, the amount of visible light the bulb puts off decreases faster than power usage. As a result, the greater a bulb is dimmed, the less energy efficient it becomes at producing light. For instance, if we took fifty 100 watt light bulbs and turned down the aforementioned dimmer to a 6.5, the amount of light the bulbs produce would be the same as using fifty 75 watt light bulbs, but they would use about 25% more power than had we installed 75 watt light bulbs. But, if we dimmed the 100 watt bulbs down to a 25 watt light bulb equivalent (a dimmer setting of 4.5) the bulbs would use about twice the amount of power than had we installed 25 watt light bulbs (Table 1).

As you might expect, it is more energy efficient to dim a 60 watt light bulb to the light output of a 25 watt bulb than to dim a 100 watt to the same level. Dimming 100 watt bulbs down to the intensity of a 25 watt light bulb would cost a grower about \$39 a week (fifty bulbs burning 24 hours a day), while dimming a 60 watt light bulb to the same intensity would only cost \$28 a week (Tables 1 and 3).

Dimmer Setting Using 100 Watt Light Bulbs	Light Bulb Equivalent (approximately)	Weekly Power Usage of Fifty, 100 Watt Light Bulbs on Dimmer	Weekly Power Usage of Fifty 75, 60, 40, and 25 Watt Light Bulbs Without Dimmer	Weekly Electricity Usage Difference
6.5	75	\$63.50	\$50.40	\$13.10
5.75	60	\$54.60	\$40.32	\$14.28
5	40	\$47.04	\$26.88	\$20.16
4.5	25	\$38.64	\$16.80	\$21.84

Table 1. Power Usage of Fifty, 100 Watt Light Bulbs on Electronic Dimmer (24 hrs/day)

Dimmer Setting Using 75 Watt Light Bulbs	Light Bulb Equivalent (approximately)	Weekly Power Usage of Fifty, 75 Watt Light Bulbs on Dimmer	Weekly Power Usage of Fifty 60, 40, and 25 Watt Light Bulbs Without Dimmer	Weekly Electricity Usage Difference
7	60	\$45.70	\$40.32	\$5.38
5.5	40	\$38.64	\$26.88	\$11.76
4.5	25	\$29.40	\$16.80	\$12.60

Table 2. Power Usage of Fifty 75 Watt Light Bulbs on Electronic Dimmer (24 hrs/day)

Dimmer Setting Using 60 Watt Light Bulbs	Light Bulb Equivalent (approximately)	Weekly Power Usage of Fifty, 60 Watt Light Bulbs on Dimmer	Weekly Power Usage of Fifty 40 and 25 Watt Light Bulbs Without Dimmer	Weekly Electricity Usage Difference
6	40	\$33.94	\$26.88	\$7.06
5	25	\$28.22	\$16.80	\$11.42

Table 3. Power Usage of Fifty 60 Watt Light Bulbs on Electronic Dimmer (24 hrs/day)

Dimmer Setting Using 40 Watt Light Bulbs	Light Bulb Equivalent (approximately)	Weekly Power Usage of Fifty, 40 Watt Light Bulbs on Dimmer	Weekly Power Usage of Fifty 25 Watt Light Bulbs Without Dimmer	Weekly Electricity Usage Difference
6	25	\$22.18	\$16.80	\$5.38

Table 4. Power Usage of Fifty 40 Watt Light Bulbs on Electronic Dimmer (24 hrs/day)

Equivalent Light Bulb Size																	
Dimmer Setting	No Dimmer	10	9.5	9	8.5	8	7.5	7	6.5	6	5.5	5	4.5	4	3.5	3	2
100 watt bulb	100	96	96	95	93	91	86	81	74	68	56	43	29	16	10	4	1
75 watt bulb	75	72	72	72	70	68	64	61	65	50	41	32	22	12	7	3	1
60 watt bulb	60	57	57	57	56	54	51	48	44	39	32	26	17	9	6	2	1
40 watt bulb	40	38	38	38	37	36	34	32	29	26	21	16	11	6	3	1	0
25 watt bulb	20	24	24	24	23	22	21	20	18	15	12	9	6	3	2	0	0

Weekly Power Usage of 50 Light Bulbs Burning 24 Hours a Day at Different Dimmer Settings (\$0.08 per Kw*hr)																	
Dimmer Setting	No Dimmer	10	9.5	9	8.5	8	7.5	7	6.5	6	5.5	5	4.5	4	3.5	3	
100 watt bulb	\$67.20	\$67.54	\$67.37	\$67.20	\$66.19	\$65.18	\$63.50	\$61.82	\$59.47	\$57.12	\$52.08	\$47.04	\$38.64	\$30.24	\$23.52	\$16.80	
75 watt bulb	\$50.40	\$50.40	\$50.27	\$50.13	\$49.26	\$48.38	\$47.04	\$45.70	\$43.85	\$42.00	\$38.64	\$35.38	\$29.40	\$23.52	\$18.31	\$13.10	
60 watt bulb	\$40.32	\$40.32	\$40.15	\$39.98	\$39.48	\$38.98	\$37.90	\$36.96	\$35.45	\$33.94	\$31.08	\$28.22	\$22.85	\$17.47	\$13.78	\$10.08	
40 watt bulb	\$26.88	\$26.88	\$26.71	\$26.54	\$26.38	\$26.21	\$25.20	\$24.19	\$23.18	\$22.18	\$19.82	\$17.47	\$14.62	\$11.76	\$9.24	\$6.72	
25 watt bulb	\$16.80	\$16.80	\$16.63	\$16.46	\$15.96	\$15.46	\$14.95	\$14.45	\$13.94	\$13.44	\$12.10	\$10.75	\$8.90	\$7.06	\$6.05	\$5.04	

It is important to note that though only one dimmer was tested, all dimmers in poultry houses are electronic, and therefore the power usage for dimmed bulbs would be similar regardless of which dimmer you use. The exact dimmer setting required to obtain a particular light bulb equivalent would likely change from dimmer to dimmer and house to house. Therefore, it is best to use a light meter to set a dimmer to obtain the desired light intensity.

Even though operating a lighting system with a dimmer may cost more to operate than using lower wattage light bulbs, there are advantages to using a dimmer, the biggest of which is flexibility. Electronic dimmers give the grower the ability to change light intensity throughout the growout with just a turn of a knob. Without a dimmer, growers often have to install more than one lighting system; one for use during brooding when higher light intensities are required, another for the remainder of the growout when lower light intensities are desirable, and possibly a third for very low light intensities during catching. Dimmers also significantly increase the life of a light bulb because they reduce the voltage to the bulb and decrease the brightness and heat of the bulb.

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