

**Incandescent** | E26 Medium & E12 Candelabra Base

This is the traditional "Edison" light bulb. It emits light in a warm, broad spectrum; however, approximately 90% of all the power consumed by an incandescent light bulb is emitted as heat rather than visible light. Given far more efficient alternatives, some governments are mandating a phase-out or ban of its use.

**Halogen** | T3 Bi-Pin, G4 Base & MR16, GU5.3 Base

Halogen is a form of incandescent. It has the truest color rendering of any light source other than the sun and is therefore often used to illuminate works of art. In the MR16 format, this long-lasting, low-voltage spot is amplified by an integrated reflector, greatly increasing its apparent efficacy.

**Ceramic Metal Halide** | E26 Medium Base

Metal Halide is an efficient, high-output lamp commonly used to illuminate large outdoor areas, in part because its output is unaffected by environmental temperature changes. Due to high intensity and slow start-up, it is best suited for outdoor and commercial applications. MHs contain mercury, requiring special disposal measures.

**Light-Emitting Diodes [LEDs]**

LEDs are a promising technology currently undergoing rapid development. Their warmth and color rendering can be comparable to incandescent in certain applications. Their small size makes them highly versatile. Given their long life, high efficiency and low toxicity, their cost is likely to be justified over time.

**Compact Fluorescent [CFL]** Integrated Ballast | GU-24 Pin & E26 Medium Base

CFLs use less energy than incandescents and can last up to eight times longer (if not overheated) while generating light that is becoming increasingly comparable. CFLs contain trace amounts of mercury, requiring special disposal measures. The ballast must be discarded along with this type of lamp.

**CFL non-integrated ballast** Twin & Quad Tube | 2G11 & GX24Q, 2 & 4 Pin Base

These CFLs utilize separate, reusable electronic ballasts; they are slightly more efficient and can last longer compared to integrated-ballast CFLs. One ballast will often run multiple wattages and permit dimming. Lamp disposal issues are the same.

**High Pressure Sodium (HPS) & White "SON"**

These lamps are typically used for streetlights and security lighting, where color rendering is not critical. HPS lamps contain trace amounts of mercury, making disposability an issue, and they decline in lumen output as they age. White "SON" is a higher cost HPS variant with a high CRI but reduced life and efficacy.

**Fluorescent Tube** | T5, T5 HO Mini Bi-Pin, T8

The "new and improved" flicker-free fluorescent tube offers good color rendering, long life and low cost. Like all fluorescents, special disposal measures are required due to mercury content.

ELEEK LAMPING COMPARISON CHART

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ENERGY watts	OUTPUT lumens	EFFICACY lumens per watt	CO2 lbs	CO2: lumen ratio	LAMP COST	LIFE (hours)	RUN COST per 1000 hrs	CRI 1—100	CCT kelvin
	1	2	3	4	5		6	7	8
25	170	07	33	.194			\$3.60		
40	495	12	46	.105	\$0.60	1000	\$5.40	100	2700
60	830	14	78	.093			\$7.80		
BI-PIN 20	320	16	26	.081	\$3.30	2K to 4K	\$3.40	100	2850
	320	16	26	.081	\$2.00		\$3.06		
MR16 35	600	17	46	.077	\$5.00	2K to 4K	\$5.80	100	2950 to 6000
	900	18	65	.072	\$9.79		\$9.26		
22	1155	53	27	.023	\$88		\$9.94		
70	4500	64	91	.020	\$32	12K	\$11.06	81—96	2900 to 4100+
150	9800	65	195	.020	\$31		\$20.50		
02	200	100*	03	.015	\$20		\$0.71		
05	500	100*	07	.014	\$38	35K to 50K	\$1.49	40—90	2900 to 6100
10	1000	100*	13	.013	\$80		\$3.06		
13	850	65	17	.020	\$3.20		\$1.88		
18	1100	61	23	.020	\$4.40	10K	\$2.60	82—90	2700 to 4100
23	1600	69	30	.018	\$4.00		\$3.16		
26	1800	69	34	.019	\$7.40		\$3.58		
32	2400	75	42	.018	\$10.00	12K to 20K	\$4.47	82—90	2700 to 6500
36	2800	78	47	.016	\$10.60		\$4.98		
80	6000	75	104	.017	\$28.00		\$11.35		
35	2250	64	46	.020	\$23.70	16K 24K	\$5.68		
HPS 70	6400	91	91	.014			\$9.38	22	1900
50	2000	40	65	.032	\$79.50	10K	\$13.95	85	2500 to 2700
SON 100	4170	42	130	.031			\$19.95		
28	2900	104	31	.015	\$9.74	25K to 35K	\$3.68	82—85	3000 to 6500+
T5 35	3450	99	70	.014			\$4.52		
17	1260	80	22	.017	\$4.84	20K to 46K	\$2.18	78—96	3000 to 6500
T8 32	2800	80	46	.016	\$2.54		\$3.91		

1 Lumens are a measurement of the perceived power of light. All ratings approximate. 2 Efficacy = lumens/watts. The higher the number, the more efficient. 3 Approximate CO2 emission per 1,000 hours of use assuming coal generated electricity. 4 CO2 output per lumen is a finer gauge of sustainability. 5 Costs are collected averages. 6 Includes electricity at national average of 12c/kwh, and average lamp cost. 7 CRI = Color Rendering Index. 100 = full color range: incandescent. 8 CCT = Correlated Color Temperature in degrees Kelvin. Low temps are "warm" colors, high: "cool". *Actual efficacies measured in application are generally between 40—60. This is rapidly improving. For resources, references and more, go to <http://www.eleek.com/lampguide.html>