

The Best Compact Fluorescent Light Bulbs: PM Lab Test

Can the new breed of energy-saving fluorescents hold their own against incandescents? We ran seven bulbs through our optical course to find out.



Michael Patrissi, a lighting and production specialist at Popular Mechanics' parent company Hearst Magazines, tests the color temperature and lux of a compact fluorescent light bulb.

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By Emily Masamitsu

Intro Photograph by Matt Sullivan; Test Photographs by Philip Friedman/Studio D
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The compact fluorescent light bulb revolution nearly occurred back in the early 1990s. When CFLs first hit the market in force, consumers bought them in large numbers — but they hated them. The bulbs were too big for many fixtures, expensive (up to \$25 each) and they threw a dim, antiseptic light that paled next to the warmth of good old-fashioned incandescent bulbs.

Now, a new CFL revolution is at hand. Retail giants are pushing hard for the bulbs — Wal-Mart hopes to sell 100 million CFLs by the end of the year. In California, a legislator recently proposed banning the sale of incandescent light bulbs in the state by 2012. All the old benefits of CFLs are still significant — more so, in fact. They can use less than one-third the electricity of incandescent bulbs of equivalent brightness and last up to nine years. The new bulbs are smaller and far cheaper (about \$5 each) than their predecessors, and more powerful than ever. Top-end 24-watt bulbs promise brightness equivalent to that of a 150-watt incandescent.

Still, when it comes to illuminating your home, brightness isn't everything. Can CFLs match the light quality of the energy-wasting incandescents we know and love?

Popular Mechanics designed a test pitting seven common CFLs against a 75-watt incandescent bulb. To gather objective data, we used a Konica Minolta CL-200 chroma meter to measure color temperature and brightness, and a Watts up? Pro ammeter to track power consumption. Our subjective data came from a double-blind test with three PM staffers and Jesse

Smith, a lighting expert from Parsons The New School for Design, in Manhattan. We put our participants in a color-neutral room and asked them to examine colorful objects, faces and reading material, then rate the bulbs' performance.

The results surprised us. Even though the incandescent bulb measured slightly brighter than the equivalent CFLs, our subjects didn't see any dramatic difference in brightness. And here was the real shocker: When it came to the overall quality of the light, all the CFLs scored higher than our incandescent control bulb. In other words, the new fluorescent bulbs aren't just better for both your wallet and the environment, they produce better light.

CFL BACKGROUND

Color temperature: The lower the color temperature, the warmer the light. Warmness (red) or coolness (blue) can be measured in degrees Kelvin by a chroma meter. We observed a temperature of about 2700 K for soft white bulbs, whereas "daylight" bulbs measured around 3400 K — real noontime sunlight ranges from 5000 K to 6500 K.

Lumens vs. lux: Manufacturers use a complex process to measure lumens, the total quantity of light emitted by a bulb. We used a light and chroma meter to measure lux, the light intensity a bulb shines on a surface. Our observed results in lux generally tracked with manufacturers' lumen ratings.

Watts and efficiency: Our ammeter's CFL wattage results were all within 3 watts of manufacturer ratings — but all CFLs use about 70 percent less electricity than incandescent bulbs. The average U.S. household has 45 light bulbs — replacing that number of 75-watt incandescent bulbs with CFLs [would save \\$180 per year](#).

Phosphor: This chemical compound lines the inside of CFL tubing. When excited, it converts ultraviolet radiation into visible light. The chemical composition of the phosphor determines the color temperature of the light emitted by the bulb.

Mercury: According to the EPA, CFLs contain an average of 5 milligrams of mercury, which increases the bulb's efficiency. But that also means you can't just trash them—CFLs must be properly recycled. Visit [Energy Star](#) or [Earth 911](#) for disposal instructions.

Beyond Fluorescent with LEDs: Light emitting diodes (LEDs) are [tiny yet powerful sources of light that are even more energy efficient than CFLs](#). Manufacturing LEDs that produce light equivalent to a 60-watt bulb is expensive, however. One bulb can cost as much as \$75.



[See the test results >>>](#)

Sylvania Double Life Soft White

Price \$1.10

Brightness Stated: 1055 lumens; Observed: 975 lux

Watts Stated: 75; Observed: 78.2

Color Temperature (*Kelvin) Stated: 2850; Observed: 2736

Color B+

Perceived Brightness B+

Faces B

Reading C+



OVERALL GRADE
B

Comments Remarkably, this Sylvania incandescent was the lowest-rated bulb. "Much warmer" than the others, but yellow colors "appeared greenish."



<<< [Introduction](#)

[N:Vision Soft White](#) >>>

 [Download](#) the Compact Fluorescent Bulb test results in printable PDF format.

N:Vision Soft White

Price \$5.97

Brightness Stated: 1200 lumens; Observed: 925 lux

Watts Stated: 19; Observed: 19.4

Color Temperature (°Kelvin) Stated: 2700; Observed: 2845

Color A-

Perceived Brightness B+

Faces A

Reading B+

OVERALL GRADE



A

Comments One of the top bulbs for reading and illuminating faces, the best-in-test bulb was "slow to warm." Still, it was "pleasing and good overall."



<<< [Sylvania Double Life Soft White](#)

[Westinghouse Natural Light](#) >>>

 [Download the Compact Fluorescent Bulb test results in printable PDF format.](#)

Westinghouse Natural Light

Price \$6

Brightness Stated: 1200 lumens; Observed: 840 lux

Watts Stated: 20; Observed: 17.5

Color Temperature (°Kelvin) Stated: 3500; Observed: 3433

Color A

Perceived Brightness A

Faces A-

Reading B-

OVERALL GRADE



A-

Comments Despite its middling luminosity, the bulb was ranked by our reviewers as one of the brightest, giving our model a “healthy” glow.



<<< **N:Vision Soft White**

Philips Marathon >>>

 **Download** the Compact Fluorescent Bulb test results in printable PDF format.

Philips Marathon

Price \$3

Brightness Stated: 1250 lumens; Observed: 865 lux

Watts Stated: 20; Observed: 20.8

Color Temperature (°Kelvin) Stated: 2700; Observed: 2680

Color A-

Perceived Brightness B-

Faces A

Reading B+

OVERALL GRADE



A-

Comments The Philips tied the N:Vision as the best bulb for illuminating faces. Participants found it “warm and cozy,” but “slightly diffuse” and “not very bright.”



<<< [Westinghouse Natural Light](#)

[MaxLite MicroMax](#) >>>

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MaxLite MicroMax

Price \$4.50

Brightness Stated: 1200 lumens; Observed: 900 lux

Watts Stated: 20; Observed: 20.3

Color Temperature (°Kelvin) Stated: 2700; Observed: 2738

Color A

Perceived Brightness B-

Faces A-

Reading B-

OVERALL GRADE



A-

Comments The MaxLite excelled at rendering colors. It appeared to emit light reminiscent of the “sun at the beach,” with “very good color vibrancy.”



<<< [Philips Marathon](#)

[Sylvania Daylight Extra](#) >>>

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Sylvania Daylight Extra

Price \$5.75

Brightness Stated: 1200 lumens; Observed: 822 lux

Watts Stated: 19; Observed: 18.9

Color Temperature (°Kelvin) Stated: 3500; Observed: 3370

Color A

Perceived Brightness A

Faces B

Reading B-

OVERALL GRADE



A-

Comments This Sylvania tied the MaxLite in best color rendering. It was a “nice, ice white” though also potentially “too bright for a heavy reader.”



<<< [MaxLite MicroMax](#)

[Westinghouse Soft White](#) >>>

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Westinghouse Soft White

Price \$6

Brightness Stated: 1200 lumens; Observed: 830 lux

Watts Stated: 20; Observed: 17.8

Color Temperature (°Kelvin) Stated: 2700; Observed: 2709

Color A

Perceived Brightness B+

Faces B+

Reading C+

OVERALL GRADE



B+

Comments Westinghouse's soft white bulb was an average scorer overall. Its "warm" light appeared very low, and hurt one person's eyes while reading.



<<< [Sylvania Daylight Extra](#)

[GE Soft White](#) >>>

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GE Soft White

Price \$5

Brightness Stated: 1200 lumens; Observed: 843 lux

Watts Stated: 20; Observed: 19.8

Color Temperature (°Kelvin) Stated: 2700; Observed: 2693

Color A-

Perceived Brightness A

Faces B+

Reading C-

OVERALL GRADE



B+

Comments Also an average scorer, this rated low as a reading light. Its “yellow” light produced “accurate” color, but details were tough to distinguish.



<<< [Westinghouse Soft White](#)

 [Download](#) the Compact Fluorescent Bulb test results in printable PDF format.