

## THE 2011 CONSUMER REPORTS GUIDE TO LIGHTBULBS



**POWER TRIP** We run each bulb through on-and-off cycles to rate its brightness and durability.

# Lightbulbs

## LEDs and CFLs offer more choices and savings

**C**ONTRARY TO WHAT you might have heard, you can still buy most incandescent lightbulbs. But we've found few reasons you should. Our tests of 26 compact fluorescents and 10 light-emitting diodes found that though the newest bulbs might not be perfect, they last longer and use less electricity than traditional incandescent bulbs, and many of the problems of earlier versions have been overcome.

We were testing CFLs, which use about 75 percent less energy and last seven to 10 times longer than regular incandescent bulbs, even before stores began widely selling them. LEDs are the newest choice. They use even less energy than CFLs and are claimed to last for decades. And federal law is set to require most screw-in bulbs to be more efficient by 2014. This report includes our first full Ratings of both types. We focused on 60-watt equivalent CFLs and LEDs because those are the most popular types sold in the U.S. Here's what we found:

**CFLs save money faster.** It usually

takes less than a year to recoup the cost of most CFLs, according to our tests, which are based on the bulbs being turned on for 3 hours a day. From that point on you're saving money by using less electricity, about \$52 dollars per 60-watt equivalent over a bulb's lifetime. Because of the high cost of LEDs, \$20 to \$60 per bulb without rebates, they can take four to 10 years to pay for themselves, based on our tests. Even at those prices, you can still save between \$65 and \$400 over the 18- to 46-year life of the LED compared with an incandescent bulb. But you probably won't save money by switching from a CFL to an LED until the price of LEDs comes down. However, our tests revealed some other reasons that you might want to switch.

**LEDs meet most of their claims.** After 3,000 hours of testing, the best LEDs were still as bright as the incandescents they replaced. But only about half were as bright as promised. All the LEDs reached full brightness instantly, even at frigid temperatures, providing warm white light

that was unaffected by frequently turning them on and off. Energy use matched or exceeded claims, and LEDs don't contain mercury (CFLs do in small amounts). Some LEDs dimmed as low as incandescents. But not all LEDs are good at shining light where you need it. So we've added a light-distribution score to our Ratings.

LEDs are supposed to last 20,000 to 50,000 hours, or about 18 to 46 years when used 3 hours a day. Nearly all the LEDs are still burning brightly after 3,000 hours, and two Cree LEDs we turned on more than a year ago had been continuously burning for more than 9,000 hours at press time. Only four of 100 LEDs stopped working. Those have lower scores for life testing, and we're continuing our testing on all the LEDs.

**Staffers try, and like, LEDs.** We asked 19 staffers to use six different LEDs at home for two weeks each and evaluate them using a questionnaire developed by our sensory specialists. Their favorites were the Philips AmbientLED, \$40, for table or floor lamps, the EcoSmart LED down light, \$50, and the EcoSmart PAR38, \$45, outdoor floodlight. But staffers said they wouldn't buy them until prices drop.

**CFLs now have less mercury.** The amount of mercury in the bulbs we tested has dropped 60 to 75 percent, compared with the already low levels we found in 2008, without affecting performance. Mercury helps CFLs produce light. And most CFLs contained less than 1 milligram of mercury. The one exception is the EcoSmart covered CFL, and even that has significantly less than Energy Star allows. Given our test results, Energy Star could consider lowering the mercury cap below 5 milligrams. Nevertheless, spent CFLs should be recycled. Home Depot, Ikea, Lowe's, and some Ace Hardware stores will accept used bulbs. Three CFLs we tested, including the top-rated GE Energy Smart Saf-T-Gard

## The best & the brightest

Go behind the scenes to see how the new energy-efficient lightbulbs stack up against incandescents.



[LINK TO VIDEO](#)

Get honest product information you need for safe, smart shopping:  
[Subscribe to ConsumerReports.org!](http://Subscribe to ConsumerReports.org)

spiral, have a plastic coating that contains mercury and any shards if the bulb breaks. Follow clean-up tips at [www.epa.gov/cfl/cflcleanup.html](http://www.epa.gov/cfl/cflcleanup.html). Sweep up a broken LED and recycle it with other electronic waste because it contains semiconductors.

**How to choose**

It isn't socket science, but there are a few terms you need to know before buying any energy-saving bulb. Energy Star-qualified bulbs meet high standards for brightness, color, and energy use, and the mercury content is capped in CFLs. Check store displays of lit bulbs to get a feel for their light quality. Then use the following shopping tips:

**Look at lumens.** You might be used to associating watts with brightness, but watts tell you only energy use. Lumens measure brightness. In spirals look for at least 450 lumens if you're replacing a 40-watt bulb, 800 lumens or more for a 60-watt bulb, 1,100 lumens for a 75-watt bulb, and 1,600 lumens or higher when replacing a 100-watt bulb. In R30 floodlights look for a lumen count that is at least 10 times the wattage of the bulb you're replacing, 650 lumens to replace a 65-watt bulb, for example.

**Don't confuse brightness with color.** The whiteness, yellowness, or blueness of light is measured by its temperature in kelvins. Incandescents produce a warm yellowish light with a color temperature of about 2,700K. At 3,000K the light is whiter and comparable to that of a halogen bulb. Bulbs in the 3,500K to 4,100K range give off a cool, bright white light, and 5,000K to 6,500K bulbs mimic natural or daylight. But those higher temps, with their bluer tones, can be unflattering indoors. Use kelvins to get the right color light because terms like soft white and warm white mean different things to different manufacturers.

**Note CRI.** In addition to temperature, the Color Rendering Index indicates how accurately colors appear under the light and ranges from 0 to 100, with daytime sunlight at 100. Most of the tested bulbs are in the low 80s; a few reached the upper 80s and low 90s. A CRI of at least 80 is generally recommended for interior lights, and differences of fewer than five points are insignificant. Few of our staffers complained about the CRI of the LEDs we tested or of the CRI of CFLs in the past.

**Read the package.** As of Jan. 1, 2012, a Lighting Facts label must appear on the packages of most bulbs. It will show brightness, energy use, estimated energy

costs, expected life, light color in kelvins, and, for CFLs, mercury content. But even bulbs we purchased without the new label had much of this info on the packaging. Note: Only the information on Energy Star bulbs has been independently verified.

**Check for rebates and coupons.** Visit [www.dsireusa.org/incentives](http://www.dsireusa.org/incentives) or [www.energystar.gov](http://www.energystar.gov)

to find utility rebates and search online for manufacturer rebates and coupons. Many are instant rebates, so you won't have to fill out any paperwork.

**Keep your receipts.** The bulbs are supposed to last for years, so save the receipts and UPC codes. You'll need them to return a bulb to the manufacturer or retailer.



**Overview**

All of the CFLs and LEDs below are Energy Star-qualified. That's important if you're looking for utility rebates. Both use roughly 65 to 85 percent less electricity than regular incandescent bulbs, though LEDs aren't much more efficient than CFLs.

**Recommended**  
All are high-performing models.

**Best for lamps or ceiling fixtures:**

- A1 GE** \$10
- A2 EcoSmart** \$1.50
- A3 Feit** \$2
- B1 Philips** \$40

All replace a 60-watt incandescent bulb and can be used outdoors if not exposed to moisture. Among CFLs, **A1** has a protective coating that contains the bulb pieces if it breaks. **A2** fully brightens the fastest, in about 19 seconds, and like **A1** is a better choice if a fixture is frequently turned on and off. **A3** is the brightest. **B1**, an LED, outperformed all tested bulbs and is dimmable. You won't see the spiral in **B3** and **B4**, and payback time is quicker for those low-cost CFLs. **B3** is fine for fixtures that are frequently turned on and off but isn't as bright. **B4** is bright but takes more than 2 minutes to fully brighten.

**Guide to the Ratings**

**Overall score** combines life and rapid on/off testing, brightness after 3,000 hours of use, light distribution, and warm-up time. **Brightness** indicates brightness of each bulb after life testing and was compared with the brightness of a comparable incandescent bulb. **Rapid on-off testing** reflects the average number of 2-minute-on and 2-minute-off cycles each bulb survived. **Warm-up time** is how long the bulb took to reach near-full brightness. **Life testing** measures how many bulbs survived 3-hour-on and 20-minute-off cycles after being on for 3,000 hours. **Light distribution** measures how well a bulb duplicates the light-dispersal pattern of an equivalent incandescent bulb. **Brightness (lumens) after 3,000 and color temperature (kelvins) after 3,000** are the averaged measured brightness and temperature of 10 bulb samples after life testing. Those with 2,700K are closest to incandescent bulbs; ones with 3,000K are similar to halogen bulbs; 4,000K and higher appear white to bluish-white. **Price** is approximate retail. **Payback time (years)** is when a bulb will start to save money when compared with an equivalent incandescent bulb, assuming the bulb is on 3 hours per day.

**Best for recessed or track lights:**

- D1 EcoSmart** \$50
- D2 GE** \$12
- D3 Feit** \$4.50
- D4 Sylvania** \$10

These replace 65-watt incandescent bulbs and can be used in semi-enclosed fixtures. They're good choices for fixtures that will frequently be turned off and on. **D1**, a dimmable LED, isn't as bright as the others but puts light where you need it. It fits most 6-inch cans and instantly warms up, unlike CFLs **D2**, **D3**, and **D4**, which take much longer. **D2** is the brightest and is dimmable. **D3** can also be used in fully enclosed fixtures.

**Best for outdoor lights:**

- E1 Utilitech** \$6.50
- F1 EcoSmart** \$45
- F3 Sylvania** \$14

**E1** replaces a 90-watt incandescent and provides excellent brightness, but like most CFLs of this type it's slow to warm up, especially in colder weather. Among replacements for 75-watt bulbs, **F1** is a dimmable LED that instantly brightens, even in cold weather. It can be used with a timer. **F3**, a CFL, is also dimmable and works with a timer and with a motion sensor.

**Get honest product information you need for safe, smart shopping:  
[Subscribe to ConsumerReports.org!](http://ConsumerReports.org)**

# Ratings Lightbulbs

In performance order, within types. (Types designated A, B, etc.)

Recommended

● Excellent ● Very good ○ Good ● Fair ● Poor

Recommendation	Rank	Brand & model <small>Similar models, in small type, are comparable to tested model.</small>	Price per bulb	Overall score  0 100 P   F   G   V   G   E	Test results							Features			
					Bulb type	Claimed life (hr.)	Brightness	Rapid on-off testing	Warm-up time	Life testing	Light distribution	Brightness (lumens)	Color temperature (kelvins)	Payback time (yr.) vs. incandescent	Dimmable
<input checked="" type="checkbox"/>	1	GE Energy Smart SAF-T-GARD 60W 78961	\$10.00	85	CFL	8,000	● ● ○ ● ●	● ● ○ ● ●	857	2737	1.5	●	●		
<input checked="" type="checkbox"/>	2	EcoSmart 60 Watt Soft White 423-599 E55M8144 (Home Depot)	1.50	84	CFL	10,000	● ● ● ● ●	● ● ● ● ●	775	2664	0.2	●	●		
<input checked="" type="checkbox"/>	3	Feit Electric EcoBulb Plus 60W ESL13T/5/ECO [1] [2]	2.00	81	CFL	10,000	● ○ ○ ● ●	● ● ● ● ●	865	2692	0.2	●	● ● ●		
	4	Philips Energy Saver 60W Soft White Mini 227827	2.00	75	CFL	12,000	● ● ● ● ●	● ● ● ● ●	766	2694	0.2	●	●		
	5	GE Energy Smart Soft White 60W FLE13HT3/3SW 97689	1.70	70	CFL	10,000	○ ● ○ ● ●	● ● ● ● ●	689	2753	0.2	●	●		
	6	Sylvania Soft White Micro-Mini 60W CF13EL 26959 [2]	3.00	69	CFL	12,000	● ● ○ ● ●	● ● ● ● ●	710	2647	0.4	●	● ●		
	7	GE Energy Smart Mini Spiral 13-60W Soft White 85383	5.00	66	CFL	12,000	● ○ ● ● ●	● ● ● ● ●	749	2708	0.7	●	●		
	8	Utilitech Soft White Mini 13W-60W 0252003 L13T6/27K (Lowe's)	1.50	56	CFL	8,000	● ● ● ● ●	● ● ● ● ●	635	2682	0.2	●	●		
	9	EcoSmart Shatter Resistant 60W Craft Light E55M814FSSS (Home Depot) [3]	6.00	46	CFL	10,000	● ○ ● ● ●	● ● ● ● ●	595	4727	0.9	●	●		

## A SPIRAL 60-watt equivalent, can be used in many applications. Most have a Color Rendering Index (CRI) between 81 and 84.

<input checked="" type="checkbox"/>	1	Philips AmbientLED 12.5W 12E26A60 60W	40.00	98	LED	25,000	● ● ● ● ●	● ● ● ● ●	848	2709	6.0	●	●
	2	Sylvania 60W Ultra LED Soft White 78675 [1] [2]	30.00	70	LED	25,000	● ● ● ● ●	● ● ● ● ●	796	2638	4.4	●	● ●
	3	EcoSmart 60 Watt Soft White A19 E55A8142 967034 (Home Depot)	4.00	65	CFL	8,000	○ ● ● ● ●	● ● ● ● ●	683	2692	0.6	●	● ●
	4	GE Energy Smart 60W Soft White 74437	5.00	61	CFL	8,000	● ○ ● ● ●	● ● ● ● ●	756	2660	0.7	●	● ●
	5	ArmorLite Safety ECO CFL Safety Coating	7.50	59	CFL	10,000	● ● ● ● ●	● ● ● ● ●	703	2699	1.1	●	● ●
	6	Utilitech Soft White 60W LBP16AM2 0082382 (Lowe's)	4.50	57	CFL	8,000	● ○ ● ● ●	● ● ● ● ●	731	2672	0.7	●	●

## B COVERED SPIRAL OR LED 60-watt equivalent, can be used in many applications. All have a CRI between 81 and 86.

<input checked="" type="checkbox"/>	1	GE Energy Smart 40W LED9A19/830/CD 62180	40.00	97	LED	25,000	● ● ● ● ●	● ● ● ● ●	468	3113	8.4	●	●
	2	EcoSmart A19 LED Bright White 40W ECS 19W120 864680 (Home Depot)	17.00	54	LED	50,000	○ ● ● ● ●	● ● ● ● ●	387	3054	4.0	●	●
	3	Sylvania 8W A19 LED Dimmable 78496 [1] [2]	20.00	54	LED	50,000	● ● ● ● ●	● ● ● ● ●	406	3095	4.2	●	● ●
	4	GeoBulb 3 A19 Soft White LED [4]	60.00	43	LED	50,000	● ● ● ● ●	● ● ● ● ●	444	3725	9.8	●	●

## C LED 40- to 50-watt equivalent, can be used in many applications. Most have a CRI between 81 and 88.

<input checked="" type="checkbox"/>	1	EcoSmart LED Downlight 10.5W 65W E26 ECO-575L Dimmable (Home Depot) Cree CR6 LED 6" 10.5-watt Downlight [3]	50.00	87	LED	35,000	● ● ● ● ●	● ● ● ● ●	583	2725	5.7	●	●
<input checked="" type="checkbox"/>	2	GE Energy Smart 65W R30 Floodlight Dimmable 21710	12.00	79	CFL	6,000	● ● ● ● ●	● ● ● ● ●	817	2730	0.9	●	●
<input checked="" type="checkbox"/>	3	Feit Electric EcoBulb Plus Soft White R30 65W Rohs BPESL15BR/2 [1] [2]	4.50	75	CFL	8,000	● ● ● ● ●	● ● ● ● ●	662	2738	0.2	●	● ● ●
<input checked="" type="checkbox"/>	4	Sylvania R30 Soft White 65W Indoor/Outdoor 29998 [2]	10.00	73	CFL	8,000	● ● ● ● ●	● ● ● ● ●	634	2684	1.1	●	● ●
<input checked="" type="checkbox"/>	5	Utilitech R30 Reflector Soft White 65W 022419 (Lowe's)	5.00	72	CFL	8,000	● ○ ● ● ●	● ● ● ● ●	683	2665	0.3	●	●
	6	EcoSmart R30 Soft White 65W Dimmable Reflector Flood 530236 (Home Depot)	10.00	67	CFL	8,000	● ● ● ● ●	● ● ● ● ●	609	2729	1.1	●	● ●
	7	Philips Energy Saver R30 Dimmable Reflector Flood 150417 EL/A [5]	12.00	55	CFL	8,000	○ ● ● ● ●	● ● ● ● ●	526	2674	1.4	●	● ●

## D FLOOD/REFLECTOR 65-watt equivalent, commonly used in recessed or track lights. Most have a CRI between 82 and 84.

<input checked="" type="checkbox"/>	1	Utilitech Soft White PAR38 90W Outdoor Flood 075232 60064 (Lowe's)	6.50	68	CFL	8,000	● na ● ● ● ○	● ● ● ● ●	1223	2696	0.3	●	●
	2	Philips Energy Saver Reflector Flood PAR38 90W 406207	8.00	57	CFL	10,000	● na ● ● ● ●	● ● ● ● ●	1125	2627	0.5	●	●
	3	GE Energy Smart Soft White PAR38 Floodlight 90W 73796	6.70	43	CFL	10,000	○ na ● ● ● ○	● ● ● ● ●	1035	2735	0.3	●	● ●
	4	EcoSmart Soft White PAR38 90W E55P8232 159979 (Home Depot)	6.50	34	CFL	8,000	● na ● ● ● ●	● ● ● ● ●	965	2691	0.3	●	● ●

## E FLOOD/REFLECTOR 90-watt equivalent, mostly used in accent or security lights. All have a CRI between 82 and 84.

<input checked="" type="checkbox"/>	1	EcoSmart PAR38 ECS 38 Bright White 75W 866194 Dimmable LED (Home Depot)	45.00	78	LED	50,000	● na ● ● ● ●	● ● ● ● ●	924	3106	4.5	●	● ● ● ●
<input checked="" type="checkbox"/>	2	Philips AmbientLED 16W PAR 38 Outdoor & Security 40803 [4]	62.00	73	LED	20,000	● na ● ● ● ●	● ● ● ● ●	851	4106	8.1	●	● ●
<input checked="" type="checkbox"/>	3	Sylvania 75W Indoor/Outdoor CF23EL/PAR38/BL1 29625 [2]	14.00	72	CFL	8,000	● na ● ● ● ●	● ● ● ● ●	1029	2713	1.2	●	● ● ●
	4	Sylvania LED 18W PAR 38 Flood Dimmable 78495 [1] [2]	55.00	67	LED	50,000	○ na ● ● ● ●	● ● ● ● ●	876	3086	5.1	●	● ● ●

## F FLOOD/REFLECTOR 60- to 75-watt equivalent, mostly used in accent or security lights. Most have a CRI between 84 and 86.

<input checked="" type="checkbox"/>	1	Philips Soft White 60W Postlight with Built in sensor 405852	10.00	76	CFL	8,000	● na ● ● ● ●	● ● ● ● ●	818	2715	1.5	●	● ●
<input checked="" type="checkbox"/>	2	GE Energy Smart 40W Postlight 85384	8.00	76	CFL	10,000	● na ● ● ● ●	● ● ● ● ●	671	2474	2.0	●	● ●

## G PORCH/POST 40- to 60-watt equivalent, used in outdoor fixtures. CRI is 83 or 84.

<input checked="" type="checkbox"/>	1	Philips Soft White 60W Postlight with Built in sensor 405852	10.00	76	CFL	8,000	● na ● ● ● ●	● ● ● ● ●	818	2715	1.5	●	● ●
<input checked="" type="checkbox"/>	2	GE Energy Smart 40W Postlight 85384	8.00	76	CFL	10,000	● na ● ● ● ●	● ● ● ● ●	671	2474	2.0	●	● ●

[1] Works with photo cell. [2] Works with motion sensor. [3] CRI is much higher than others in group. [4] CRI is much lower than others in group. [5] Some versions made before June 2010 have been recalled.