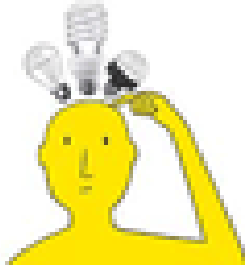


Confusion about fluorescent lighting

Nancy Davis Kho, Special to The Chronicle

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Many readers wrote in to share their experiences with lighting in response to the Home&Garden article about energy-efficient alternatives such as fluorescents, halogens and LEDs.

From homeowners who put up with bulbs that hum and flicker because their electricity bills have gone down, to self-professed environmentalists who won't use CFLs because of disposal problems, one thing is clear: Making the right choice about energy-efficient lighting requires a refined understanding of the choices.

Plenty of readers welcome the push toward energy efficiency, like homeowner Betty Chrisman, who helps run the appliance efficiency compliance program for the California Energy Commission, which develops and implements energy standards for new consumer and commercial appliances. She lives in Granite Bay (Placer County) and made the switch to CFLs in her home in February 2001.

"Since we switched to CFLs seven years ago, we continue to use one-third less electricity than we did prior to switching to CFLs," she says.

But many readers experimented with newer energy-efficient options only to return to incandescents. Melinda Ansel of Greenbrae summed it up: "I have really tried to get up close and personal with CFLs. So far, it's been a frustrating and confusing relationship. The only places I can use them are in the hall, basement and garage. ... I'll wait for development to catch up with my needs." She says they're not bright enough to read or sew by, and she has trouble finding bulbs that will fit her lamps.

To help readers who have considered throwing in the towel, here's a primer of common concerns - and possible solutions.

Extending the life of a CFL

It's frustrating to lay out more cash for a long-life CFL (as much as \$15 per bulb versus less than \$1 for an incandescent) only to have it burn out just as fast. Reader Judie Jason voiced a common complaint when she wrote: "We tried (CFLs) in a ceiling light in our bedroom and they burned out in two days." Jason said the CFLs were placed into an ordinary ceiling fixture with a glass cover.

The problem was probably heat buildup. One of the main reasons that standard screw-in CFLs expire before their projected life expectancy is that they get too hot. Apparently, recessed (also known as ceiling cans) and covered fixtures are particularly tough on CFLs because heat generated by the lamp and ballast is trapped inside the fixture. This can lower light output as well as potentially shortening the lamp's life.

Lighting designer Randall Whitehead says, "Both screw-in CFLs and standard incandescent lamps have shorter lives when put into recessed fixtures." With recessed down lights becoming increasingly popular, the industry is taking action.

Possible solutions: In 2006 the U.S. Department of Energy sponsored a competition to encourage development of screw-in reflector CFLs (R-CFLs), designed to stand up to trapped heat and throw down light efficiently for a minimum of 6,000 hours. Ten bulbs passed the test. (For the list of winning bulbs, go to www.pnl.gov/rlamps.) Made by General Electric, Osram Sylvania, Philips and Feit, they are available from retailers such as Wal-Mart and Costco and cost \$7 to \$20.

Another option suggested by reader Gary Farber of Farber Energy Design, is recessed fixtures specifically hard-wired for use with plug-in CFLs. In these fixtures, the ballast, which is the device that regulates the electricity used by the bulb, is separate from the bulb and resides in the fixture itself.

"The recessed fixtures on the market that use hard-wired CFLs are vented to allow the heat to escape," Whitehead says, which helps prolong the life of the bulbs.

Whitehead, however, is a fan of light-emitting diodes, which produce very little heat, are still fairly new - and fairly expensive. When he is working with recessed features in residential settings, he prefers LED down lights - non-dimmable LEDs from

SuperBrightLEDs.com for about \$35 apiece or the dimmable version from Color Kinetics (a subsidiary of Philips) for about \$75.

CFLs also will last longer when they're not turned on and off frequently. Reader Linda Atkins of San Francisco pointed out that "if you put one in your retail establishment, where the lights are routinely left on for 12 or 15 hours, you will likely get excellent value from your fluorescents."

"But if you are a homeowner or renter who is conscientious about turning off lights each time you leave a room, you may find that one of these highly expensive bulbs doesn't make it past six months." Atkins does use a few CFLs in her apartment, but she has reverted to incandescents in many of her fixtures.

The California Energy Commission recommends CFLs in settings where they will be left on for an hour or more a day. That may call for readjustment of the admirable impulse to turn off lights whenever you leave a room; if they're CFLs and you're returning in 15 minutes or fewer, it's better to leave them on.

Which bulbs with dimmers?

Two frequently asked questions were whether CFL or LED lamps can be used in fixtures on a dimmer switch and whether they can replace three-way incandescent bulbs.

Lighting designer Susan Oster of LIT Inc. cautions that the answers depend on the type of fixture. "If you're talking about a single circuit, it's probably fine. But if you're retrofitting fixtures in an older house, say one with the old knob-and-tube wiring, it's best to consult an electrician or a lighting expert first." Popular before the 1950s, knob-and-tube wiring can be tricky to use with modern electrical appliances.

Possible solutions: There are CFLs that are compatible with dimmer switches, and they are marked as such on the packaging. But be prepared to pay a premium over standard CFLs. Maxlite sells a dimmable bulb called Dimmax for about \$14, and 1000bulbs.com has a selection in the \$13 range.

Using dimmers with LEDs also depends on the fixture. According to Oster: "If you use a 12-volt LED system, you must use a compatible, low-voltage-rated dimmer to operate the light source. In a 120-volt LED system, a standard dimmer will work. As

always, you must size the dimmer capacity (total wattage of the source to be dimmed) with the dimmed light source."

There are three-way CFLs from commercial retailers at roughly the same price as the dimmable CFLs. But if the CFLs have the older magnetic ballasts rather than electric, be prepared to wait a moment between switching from the low to the higher setting, because magnetic ballast CFLs take longer to illuminate. Atkins of San Francisco says she's learned a trick for using older three-way CFLs in her lamps: "You turn it on, you wait a minute until it fully lights, you turn it up to the next level, you wait a minute ..."

Older lighting fixtures

Even when readers find CFLs bright enough for the living room, another problem may arise: The ballast doesn't fit in an older lighting fixture because the threaded area is too short, or else it fits the socket but the bulb is so big that the harp and lamp shade can't be put back on. Ansel of Greenbrae had this experience. When she finally found CFLs bright enough to read by, "Guess what? They're too big to fit inside the harps. Change the harps? No can do. The lamp shades would then be too high."

Possible solutions: The trick here is to find CFLs with smaller bases or that mimic the size and look of the traditional incandescent, easily found at local lighting stores. Oster recommends CFLs with a candelabra base.

"I'm using one right here at my desk from Bright Effects," Oster says, "and it is 4 inches high. It would work in any lamp."

LED manufacturers are also warming to the idea of creating bulbs that can replace an incandescent in a table lamp. Dutch manufacturer Lemnis Lighting recently introduced the Pharox LED lamp to the United States, available online from www.upscalelighting.com. It has the shape and color quality of an incandescent, if not the cost: Each Pharox bulb costs \$59. Then again, it has a projected life of 35 years.

Health issues

A few readers were worried about negative health effects of CFLs. Cathlin Davis of Turlock (Stanislaus County), writes: "I suffer from migraines, and even those new top-of-the-line fluorescent lights flicker. Most people can't see it, but people with light sensitivity can." She uses no CFLs in her home and has additional incandescent lighting in her office for when overhead fluorescent lighting proves too much.

Reader Scott Powell of Oakland pointed to a range of research that supports his belief that "one of the downsides of most fluorescent fixtures is that they have a very limited light spectrum, flicker and can be draining to work or live under."

Other readers wondered where the push toward energy efficiency will leave full-spectrum incandescent bulbs, which are designed to closely replicate natural daylight and are often touted for people suffering the effects of seasonal affective disorder, commonly known as SAD, a type of depression brought on by the short days and long nights of winter.

Possible solutions: CFL manufacturers are bringing bulbs to the market that are both energy efficient and full spectrum, like the BlueMax line from Full Spectrum Solutions, which cost \$9 to \$22.

For some, perhaps, actual daylight is the answer. Solar-tube skylights like those manufactured by Solatube can capture sunlight on the rooftop and redirect it down a reflective tube into interior spaces, illuminating as much as 500 square feet, depending on the size of the tube installed.

CFL pros, cons

A few readers on SFGate complained about the "hideous" and "harsh" light of CFLs, and more griped about the long delay between turning on a light and waiting for it to fully brighten.

Possible solutions: Other readers said they'd resolved those problems by purchasing the "medium" color temperature bulbs and venturing beyond Home Depot and Kmart for their lamps. It supports Randall Whitehead's contention that what most people are buying at the supermarket and big-box stores are not the best CFLs on the market. "They are simply the cheapest," Whitehead says. "If they want good color quality and dimmability, they need to seek out better CFLs. This is true of most products; a well-made shirt costs more but it lasts longer and looks better."

In 2002, California's Department of Toxic Substances Control decreed CFLs, which contain mercury, a hazardous waste, which makes it illegal to throw them into the trash. Residences were exempt from these regulations until 2006, but now homeowners must comply: No CFLs in the trash ever - even if you double-bag them.

And yet, many readers admitted to doing just that, perplexed at what proper disposal requires. As one reader wrote: "I believe I've spaced out myself once or twice and put one in the regular trash. From that, I would guess that *lots* of people will occasionally make the same mistake."

Bill Pollock, supervising hazardous-materials specialist of Alameda County Household Hazardous Waste, is frustrated at the disparity between the ease of buying CFLs and the difficulty in disposing of them.

"It should be much easier for the public to recycle fluorescent lamps," he said. "Manufacturers, distributors and retailers have sophisticated logistics systems that can get lamps largely manufactured overseas to hundreds of thousands of retail outlets all over the country, but they can't manage to (or won't) use those same distribution channels to collect spent bulbs."

Leonard Robinson, chief deputy director of the state's toxic substances department, recognizes that as new regulations make CFLs the de facto lighting choice for many, disposal will have to get easier: "Our goal is to make CFL disposal free, local and convenient," Robinson says. His department is working to establish CFL collection points where people work, shop, play and worship.

The department kicked off a California Take-it-Back Partnership Campaign almost two years ago to raise awareness about proper CFL disposal and enlist the support of retailers to take back the burnt-out CFL bulbs they sell.

"Wal-Mart and Ace Hardware are on board, and we're currently talking to Home Depot," Robinson says. He is also working with a task force to create a system of collection and recycling, which may involve providing prepaid mailing supplies a la Netflix to send burnt-out CFLs to recycling centers. Sylvania already sells a recycling kit on its Web site for \$15. It holds as many as 15 CFLs in a prepaid, pre-labeled recycling kit that can be shipped via regular mail.

At recycling centers, the CFLs are dismantled and the mercury is distilled for reuse, while other lamp parts are recycled. Alameda County Household Hazardous Waste, for instance, ships its CFLs to AERC Recycling in Hayward, which separates mercury-containing lamps into their main components, recovers the mercury and recycles 100 percent of the parts.

A broken CFL is a much bigger headache to clean up than a broken incandescent (see sidebar). If you do use CFLs, handle them carefully and familiarize yourself with recycling spots - many hardware stores accept CFLs, and waste-removal companies have designated drop-off locations. But be careful about stashing CFLs in a box for too long; one bulb dropped onto another could create a real environmental mess.

More inside

Resources for where to learn more about, purchase and recycle lighting. **F4**

Step-by-step what to do if a CFL breaks. **F4**

If a CFL breaks

- Open all doors and windows to ventilate the area for at least 15 minutes.
- Turn off your air conditioner/fan/heater so as not to circulate any mercury vapor.
- Young children and pregnant women should leave the area during cleanup.
- Wear protective equipment, such as a dust mask and gloves, to keep bulb dust and glass from being inhaled or contacting your skin.
- Carefully remove the larger pieces and place them in a secure closed container.
- Next, begin collecting the smaller pieces and dust. It is recommended that you use two stiff pieces of paper such as index cards or one of the many commercial mercury spill kits available.
- Put all material into a sealed container. Pat the area with the sticky side of duct, packing or masking tape. Wipe the area with a damp cloth.

- Put all waste and materials used to clean up the bulb in a secure closed container and label it "Universal Waste - broken lamp."
- Take the container for recycling to the household hazardous waste facility nearest you.
- If the bulb breaks on carpet, the state of Maine's report (<links.sfgate.com/ZCXI>) suggests removing the area of carpet that has been contaminated as a precaution. If this is not feasible, it is recommended that you ventilate the area for several hours as well as during the process of vacuuming because vacuuming can circulate the vapor. If you vacuum, make sure to dispose of the bag along with the broken CFL at your local hazardous waste facility. You should also ventilate the room during the next few times you vacuum the area.

Source: California Department of Toxic Substances Control

Resources

- Randall Whitehead, Randall Whitehead Lighting Solutions, www.randallwhitehead.com. (415) 626-1277.
- List of U.S. Department of Energy-approved Reflector CFLs (R-CFLs) www.pnl.gov/rlamps/ordering.stm.
- SuperBrightLEDs.com
- Color Kinetics (division of Philips,) www.colorkinetics.com/.
- Susan Oster, LIT Inc., www.litwell.com. (760) 777-0926.
- 1000bulbs.com, www.1000bulbs.com.
- Pharox LED lamp from Lemnis Lighting, www.upscalelighting.com.
- Full Spectrum Solutions, www.fullspectrumolutions.com. (888) 574-7014.
- Solatube, www.solatube.com.
- California Department of Toxic Substances Control, dtsc.ca.gov.

-- Sylvania RecyclePak, <links.sfgate.com/ZCXM>.

-- For information on CFL recycling locations: www.earth911.org.

What they cost

Incandescent

Less than \$1

Long-life CFLs

Up to \$15

Reflector, full-spectrum CFLs

\$7 to \$22

Dimmable CFLs

\$13 to \$14

LEDs

\$35 to \$75