

Mercury & Fluorescent Lights

Although it's a necessary chemical in some industrial processes and products—including fluorescent lights—mercury is best avoided. You won't likely ever get a dose to make you "mad as a hatter" (hat makers once used mercury to make felt), but mercury pollution and poisoning are serious concerns.

Elemental mercury (Hg) enters the environment primarily from the burning of fossil fuels, especially burning coal or petroleum to make electricity. When released into the environment, bacteria in soil and water convert elemental mercury to methylmercury (CH₃Hg), which is far more toxic than the toxic-enough elemental mercury. Methylmercury concentrates as it moves up the food chain, which is why health authorities recommend limiting consumption of some foods like certain fish. Fetuses and children are especially vulnerable to methylmercury.

Fluorescent lights, including compact fluorescent lights (CFLs), contain small amounts of elemental mercury vapor. As electrons are driven through the tube, ultraviolet (invisible) light is generated that excites the phosphor (fluorescent) coating on the tube to emit visible light. The amount of mercury in fluorescent lights has declined due to better manufacturing practices. Fluorescent tubes with green end-caps contain 3.5 to 4 milligrams of mercury rather than the typical 8 to 14 mg. Older CFLs contained about 4 mg of mercury, while new ones can have as little as 1 mg. (For perspective, older types of oral thermometers contained about 500 mg of Hg.)

New Federal Trade Commission labeling requirements for all lightbulbs require CFLs to reveal that they contain mercury and points consumers to the government's CFL gateway web page: epa.gov/cfl. When their useful life is over, fluorescent lightbulbs need to be properly recycled. In fact, many jurisdictions *require* recycling instead of discarding them.

Energy Star says that "even though CFLs contain a small amount of mercury that could ultimately end up in the environment, that amount is significantly less than the amount of mercury avoided as a result of energy savings." But what about the risk of mercury exposure in the home due to a broken fluorescent lightbulb or tube? While the risk of breakage is very low, accidents happen. To minimize breakage risk, make sure the bulb is cool before you remove it and twist from the base, not the bulb. Also, don't overtighten when installing.



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In 2007, the Maine Department of Environmental Protection measured mercury contamination from broken CFLs under various ventilation and cleanup strategies. Their worst-case scenario—designed to put the most mercury vapor in the air—resulted in an initial increase that exceeded the Occupational Safety and Health Administration permissible exposure level of 0.1 mg per cubic meter, spiking at 1 foot above the floor level. At 5 feet above the floor, it was only 18% of that amount (about where a standing adult breathes). After one hour, the concentration at the 1-foot level was about one-fifth of the spike.

However, most of the mercury in a broken CFL is not released in vapor form, but remains attached to the broken components and phosphor powder. If the bulb is broken, the vapor released into the surrounding air is between 0.001% and 0.007% of the total amount of mercury in the bulb. If you break a CFL in your home, don't panic, but do take precautions (see sidebar).

Of course, you can eschew mercury in your lighting altogether by switching to LEDs, which contain no mercury, last far longer, and are coming down in price and going up in quality. Also mercury-free is the Vu1, with its electron-stimulated luminescence technology. Either option is more expensive initially than a CFL or an incandescent (which are increasingly not an option), but will result in a good energy savings payback.

—Andy Kerr

For more info

Environmental Protection Agency bit.ly/CFLcleanup.

Locate fluorescent and other recycling centers and drop-off points at bit.ly/CFLrecycle.

CFL Cleanup

Before Cleanup

- Vacate people and pets from the room.
- If you have central forced air heating/air-conditioning system, shut it off.
- Air out the room for five to 10 minutes by opening a window or door to the outdoors.
- Collect materials needed to clean up the broken bulb:
 - Stiff paper or cardboard
 - Sticky tape
 - Damp paper towels or disposable wet wipes (for hard surfaces)
 - A glass jar with a metal lid or a sealable plastic bag

During Cleanup

- Use disposable gloves.
- Do not vacuum, which could spread mercury-containing powder or mercury vapor. Vacuuming is not recommended unless broken glass remains after all other cleanup steps have been taken.
- Be thorough in collecting broken glass and visible powder.
- Place cleanup materials in a sealable container.

After Cleanup

- Promptly place all bulb debris and cleanup materials, including vacuum cleaner bags, in an outdoor trash container or protected area until materials can be disposed of. Avoid leaving any bulb fragments or cleanup materials indoors.
- Next, check with your local government about disposal requirements in your area. Some localities require fluorescent bulbs (broken or unbroken) to be taken to a local recycling center. If there is no such requirement in your area, dispose of the materials with your household trash.
- If practical, continue to air out the room where the bulb was broken and leave the heating/air conditioning system off for several hours.