What You Need to Know about Mercury in CFLs

What is mercury and where can it be found?

Mercury is an element (Hg on the periodic table) found naturally in the environment, including the air, soil, and water. Humans cannot create or destroy mercury. Pure mercury is a liquid metal, sometimes referred to as quicksilver.

Where is mercury most prevalent in the environment?

Mercury is found in many rocks, including coal. When coal is burned, mercury is released into the environment. Of all the mercury humans release into the air, coal-burning power plants are the largest source, accounting for over 40 percent of total emissions. Mercury in the air eventually settles into water where it can transform into methyl mercury and build up in fish.

Burning hazardous wastes, producing chlorine, breaking products containing mercury, as well as the improper treatment and disposal of products or wastes containing mercury, can also release it into the environment.

Where can mercury be found at home?

Mercury is contained in some of the products we use and in some of the fish we eat. It can be found in your home, in health care facilities, at the dentist, and in schools. Mercury is used in products because of its excellent conductivity and high surface tension.[1]

These are some products containing mercury in the home.	
Products	**Average Amount of Mercury[2]**
Most CFLs, including ENERGY STAR light bulbs	Less than 5 mg
Button cell batteries used in watches, hearing aids, some toys, and calculators	9 mg
Street lighting	30 mg
Dental amalgam	82 mg per filling[3]
Fever thermometer	Up to 1000 mg
Old-style residential thermostats	Up to 4,500 mg
Mercury blood pressure monitors	110,000 g
Mercury barometers	500,000 mg

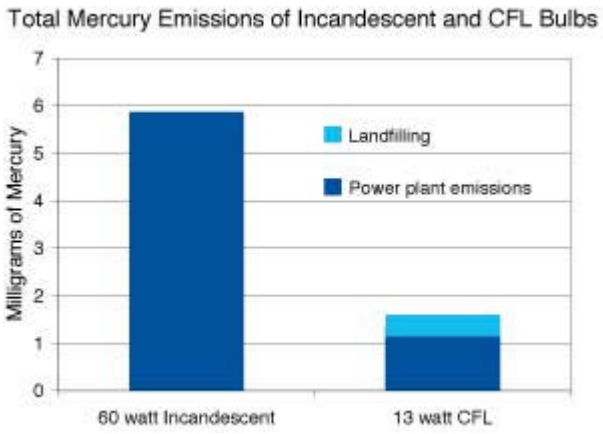
Size comparison of mercury found in a typical compact fluorescent light bulb sold in the U.S.[4]

In addition, compact fluorescent light bulb manufacturers continue to find ways to reduce the amount of mercury in the bulbs. See http://www.nema.org/gov/env_conscious_design/lamps/cfl-mercury.cfm.

Why Use an ENERGY STAR® Qualified Light Bulb?

CFLs carrying the ENERGY STAR® label use up to 75 percent less electricity and last up to 10 times longer than traditional incandescent bulbs. For example, a qualified 13-watt light bulb produces the same amount of light as a 60-watt incandescent bulb. The same ENERGY STAR qualified light bulb also produces about 75 percent less heat, which reduces home cooling demands, saving even more electricity.

While ENERGY STAR qualified light bulbs contain a small amount of mercury, their use creates a net reduction of mercury emissions to our environment, as compared to using incandescent lighting. Since they use less electricity than traditional incandescent bulbs, less power from coal-fired plants is required, resulting in reduced mercury emissions, as shown below.



Note: Actual emission comparison may vary regionally and doesn't pertain to the Northwest, Canada, Vermont, or parts of California.

Most mercury used in CFLs is recycled or landfilled and not released to the air or water.[5]

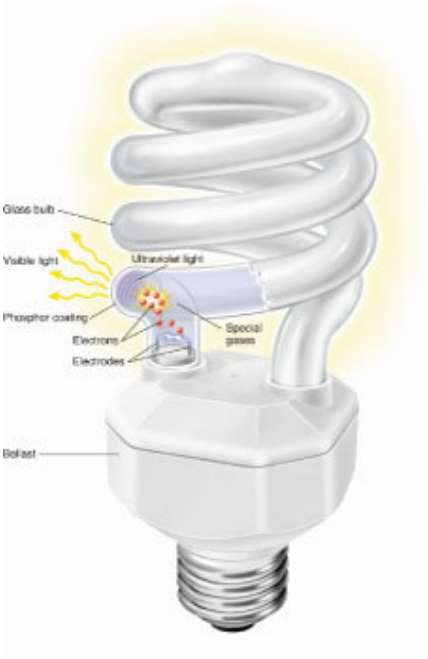
Why is Mercury in a CFL?

All CFLs, including ENERGY STAR qualified light bulbs, require mercury to provide light.

There are electrodes at both ends of the fluorescent tube, and a gas containing argon and mercury vapor is inside the tube.

A stream of electrons flows between the electrodes at both ends of the tube. The electrons interact with mercury vapor atoms floating inside the tube.[6]

The mercury atoms become excited, and when they return to an unexcited state, they release photons of light in the ultraviolet region of the spectrum. These ultraviolet photons collide with the phosphor coating the inside of the tube, and the phosphor glows, creating white light.[7]



CFLs are typically manufactured with recycled mercury, and no mercury is emitted when an ENERGY STAR qualified light bulb is in use.

How do I Install a Compact Fluorescent Light Bulb (CFL)?

To properly install or remove the bulb, grip the bulb by its base. Depending on the base of your bulb, it may need to be pulled straight out for pin based lamps, or twisted and turned for GU-24 base lamps, instead of unscrewed for traditional screw-bases.

Why is it Important to Recycle?

Since all CFLs contain mercury, lamps should be handled responsibly. Information about recycling, sorted by state, can be found at the following websites: www.epa.gov/bulbrecycling, www.lamprecycle.org or www.earth911.org.

What Should I do if a Compact Fluorescent Light Bulb (CFL) Breaks?

Dr. David Ray, Associate Professor in Neurotoxicology at the University of Nottingham, supports the assessment that there is minimal risk to the individual homeowner from single bulb breakages.[8] However, as an added precaution please take the following steps if a compact fluorescent light bulb breaks:

1. Open a window and leave the room for 15 minutes or more.

2. Carefully scoop up the fragments and powder with stiff paper or cardboard and place them in a puncture proof, tightly sealed container, such as a glass jar. Use disposable rubber gloves, if available, i.e., do not use bare hands. Wipe the area clean with damp paper towels or disposable wet wipes, and place them in the sealed container. Do not use a vacuum or broom to clean up the broken bulb on hard surfaces.

3. Place all cleanup materials in the sealed container. Take broken and unbroken lamps to a local recycling center. Wash your hands after performing cleanup and disposing of the sealed container.

4. If a fluorescent bulb breaks on a rug or carpet, first, remove all the materials you can without using a vacuum cleaner, following the steps above. Sticky tape (such as duct tape) can be used to pick up small pieces and powder.

If vacuuming is needed after all visible materials are removed, vacuum the area where the bulb was broken, then remove the vacuum bag or empty and wipe the canister, and put the bag or vacuum debris in two sealed plastic bags in the outdoor trash or a protected outdoor location for normal disposal.[9]

Notes

1. http://epa.gov/mercury
2. www.capecodextension.org
3. Dental from MVS Solutions, Inc, www.mvssolutions.com
4. Photo courtesy of Monte Helm, Ph.D. Fort Lewis College
5. http://www.energystar.gov/ia/partners/promotions/change_light/downloads/Fact_Sheet_Mercury.pdf
6. The Cadmus Group, 2002
7. http://home.howstuffworks.com/fluorescent-lamp.htm
8. http://www.treehugger.com/files/2008/01/bbc_on_safe_disposal_of_cfls.php
9. http://www.ciwmbc.ca.gov