



IT'S YOUR HEALTH



The Safety of Compact Fluorescent Lamps

The Issue

More and more Canadians are replacing regular incandescent light bulbs with more energy-efficient products, such as compact fluorescent lamps (CFLs). While CFLs are being promoted because they are energy-efficient, their use has also raised health concerns.



Background

The federal government has adopted a national standard for lighting efficiency that will come into effect in 2012. Most traditional, incandescent bulbs currently available will not meet the required performance level. The objective is to ensure that only more efficient bulbs such as CFLs, enhanced halogens, and others that are expected in the near future, are used in Canada.

Fluorescent lights have been around for a long time, and CFLs are the latest variation on the traditional tube fluorescent light. CFLs fit into a standard light bulb socket. Like the old-style fluorescent lights, they use a different method to produce light, which makes them energy-efficient. They are low-pressure, mercury vapour lamps that produce invisible ultraviolet (UV) rays. When the lamp is turned on, the mercury vaporizes inside the lamp and becomes 'excited' by the high voltage electricity. The UV then 'excites' the phosphor coating inside the lamp, which emits the light you see.

With more Canadians using CFLs, some have begun to question their safety, including the level of UV emissions, the electric and magnetic fields (EMFs) they create, and the presence of mercury in the lamps. In response to concerns, Health Canada has conducted UV radiation and EMF tests on a range of CFL bulbs, and submitted a final report outlining the results to Natural Resources Canada who commissioned the study.

What CFLs Emit

Ultraviolet Radiation

Canadians can be exposed to ultraviolet (UV) radiation from a variety of natural and artificial sources, including the sun, welding equipment, lasers, tanning equipment, and fluorescent lights. The incandescent lights that have been used by Canadians also emit UV radiation. UV can be beneficial: it can be used to kill germs and treat various skin conditions, and it is needed to form vitamin D in our bodies. At the same time, there are risks attached to all forms of radiation, and overexposure to UV has been linked to sunburns, premature skin aging, skin cancer, eye problems, and weakening of the immune system.

As noted above, fluorescent lights produce UV when the mercury vapour is 'excited' by the electrical current.

However, the amount of UV produced is so small that it is not considered hazardous to your health. The results of the Health Canada study showed that, when either CFLs or regular light bulbs (incandescent) are used at a distance of 30 cm or more, UV emissions do not present a health risk to the general population. Health Canada recommends that people keep this minimum distance between themselves and any light source. When CFLs or regular light bulbs are used daily at 30 cm, exposure should be limited to no longer than 3 consecutive hours.



Although the amount of UV emitted by CFLs pose no problem for the average person, some people are extremely sensitive to UV and may be affected by the amount of UV produced by CFLs. Those who have Lupus or another auto-immune disease and certain skin conditions can be sensitive to the UV from CFLs, in the same way they would be sensitive to sunlight and other light bulbs that emit UV. If you believe you are suffering from symptoms related to UV, you should consult your health care provider.

Electric and Magnetic Fields

Electric and magnetic fields (EMFs) surround all electrical equipment from appliances to power cords to outdoor power lines. You cannot see or feel them. An electric field forms whenever you plug a lamp or an appliance into an outlet, even if it is not turned on. The higher the voltage, the stronger the electric field.

A magnetic field forms when the current is flowing through the wire or appliance. The greater the current, the stronger the magnetic field. Electric and magnetic fields can occur separately or together. For example, when you plug in a lamp, it creates an electric field. When you turn the lamp on, the flow of current creates a magnetic field, in addition to the electric field.

Like other electric appliances found in the home, CFLs emit EMFs. Health Canada has made measurements of the EMFs at 20 centimetres from the lamps, and when compared to departmental and international science-based guidelines, the levels of emissions are well below the maximum levels of exposure. Health Canada does not consider the EMFs from CFLs to be a health risk. This conclusion is in line with current international scientific opinion.



What is in a CFL?

Mercury is the only existing element that produces the UV wavelengths needed to make CFLs work. While mercury is a highly toxic substance, only a very small amount is used in a CFL, about the amount to cover the tip of a ballpoint pen. There is no risk to your health when the lamps are unbroken. Even when a CFL is broken, there is a very low risk to your health, unless you mishandle it or store it carelessly. Health Canada has developed clean-up procedures, which are found in the following section.

Health Risks of CFLs

Sensitivity to CFLs

In the past, some people reported headaches or eye strain when using fluorescent lighting. Some could see a flicker in the lighting, caused by lower frequencies and magnetic ballasts. The newer CFLs use higher frequencies and electronic ballasts, which means the human eye cannot detect any change in the light frequency. There is also less of a 'hum' in the newer lights. The 'hum' in older lights may have caused headaches.

There have been individual reports of health effects such as headaches and depression from the use of CFLs. It may be possible that a small number of people are more sensitive to CFLs as noted above; the majority of people are not. Health Canada will



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continue to review the scientific evidence as it becomes available, and act if any potential risk is found.

Minimizing Your Risk

Although CFLs are considered safe to use, here are some steps you can take to further protect you and your family:

- Always handle CFLs carefully when installing and removing them.
- Check with your municipality to see if CFLs can be recycled in your area. Recycling them means that the small amount of mercury they contain will not end up in the environment.
- If you have skin sensitivities to UV, or have Lupus or another auto-immune disease that makes you sensitive to UV, you can take these steps:
 - > Buy CFLs that are marked low UV.
 - > Buy CFLs that have a glass cover already added, which will help further filter out UV radiation.
 - > Use additional glass, plastic or fabric materials in your lighting fixtures to act as UV filters.
 - > Increase the distance you are from the CFL, as this will reduce the level of UV exposure.

- If you break a CFL, follow these directions for clean-up:

Leave the room

- > Remove people and pets from the room and keep them out of the room during the clean-up process.
- > Avoid stepping on any broken glass.

Ventilation

- > Ventilate the room for at least 15 minutes prior to starting clean-up by opening windows and doors to the outdoors. This will ensure that mercury vapour levels are reduced before you start cleaning.

Clean-up Directions for Hard and Carpeted Surfaces

- > Do not use a vacuum to clean up the initial breakage, as it will spread the mercury vapour and dust throughout the area and may contaminate the vacuum.
- > Wear disposable gloves, if available, to avoid direct contact with mercury and to prevent cuts.



- > Scoop or sweep up the broken pieces and debris with two pieces of stiff paper or cardboard. Do not use a broom.

- > Use sticky tape, such as duct tape or masking tape, to pick up any remaining fine glass or powder.
- > Wipe the area with a damp paper towel, cloth or disposable wet wipe to remove any residual particles.
- > Place the broken glass and clean-up materials in a glass container with a tight fitting lid to further minimize the release of mercury vapour.

Carpeting - Steps to Take After the Initial Clean-up

- > If the rug is removable, take it outside, shake and air it out for as long as is practical.
- > The first time you vacuum on installed carpet after the clean-up, shut the door to the room or close off the area as much as possible and ventilate the room in which the lamp was broken by opening the windows and doors to the outside. When the vacuuming is done, remove the bag, wipe the vacuum with a damp paper towel, cloth or disposable wet wipe, and then place the vacuum bag and paper towel in a sealed plastic bag outside. In the case of a canister vacuum, wipe the canister out with a wet paper towel and dispose of the towel as outlined above. Continue to ventilate the room for 15 minutes once the vacuuming is completed.

Disposal

- > Immediately place waste material outside of the building in a protected area away from children.
- > Dispose of the waste at a household hazardous waste location as soon as possible.

Check with local, provincial, or territorial authorities about the requirements for recycling and for the location of household hazardous waste depots or pick-up.

- > Do not dispose of the waste in your household trash.
- > For further information on disposal, please contact Environment Canada.

Washing

- > Wash your hands after storing and disposing of waste.

Additional Information



- > Remove and install the CFL by handling only the base of the lamp to prevent any unnecessary pressure on the glass that may cause it to break.
- > Consider using a drop cloth when replacing a CFL to minimize the chance of breakage should the lamp fall or to protect the flooring and assist in clean-up should the bulb drop and break.
- > Store fluorescent lamps in containers that prevent them from breaking, such as in their original packaging.
- > Consider avoiding the use of CFLs in areas where the lamps may be easily broken.

Government of Canada's Role

Health Canada has studied UV radiation and EMF emission levels from CFLs. The study determined that CFLs, if used as directed, do not currently pose a health hazard to the general population from UV radiations and EMF emission levels.

Health Canada has developed a guideline document, commonly known as Safety Code 6, that specifies limits for safe human exposure to radiofrequency EMFs. The exposure limits specified in this document are based on an ongoing review of published scientific studies. Using the data from these studies, Health Canada sets the general public exposure limits at 50 times lower than the threshold for adverse health effects.

Need More Info?

- Visit Health Canada's **Consumer and Clinical Radiation Protection Bureau** web section at: www.hc-sc.gc.ca/ahc-asc/branch-dirgen/hecs-dgsesc/psp-ppsp/ccrpb-bpcrpcc-eng.php
- **Executive Summary**: Report on Health Canada Survey of Ultraviolet Radiation and Electric and Magnetic Fields and Compact Fluorescent Lamps at: <http://oe.nrcan.gc.ca/residential/personal/cfl-impact-study.cfm>

Also, see the following *It's Your Health* Articles:

- **Ultraviolet Radiation from the Sun** at: www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/ultraviolet-eng.php



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Updated:

May 2010

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- **Mercury and Human Health** at:
www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/merc-eng.php

- **Electric and Magnetic Fields at Extremely Low Frequencies** at:
www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/magnet-eng.php

For more on CFL regulations, visit:

- Natural Resources Canada, **lighting equipment** at:
<http://oee.nrcan.gc.ca/residential/personal/new-lighting.cfm>

- Environment Canada, **Mercury and the Environment** at:
www.ec.gc.ca/mercure-mercury/

- Environment Canada, **disposal of CFLs** at:
www.ec.gc.ca/mercure-mercury/default.asp?lang=En&n=4A0FC5CF-1

- The Electrical Safety Authority's notice on **end-of-life failure of CFLs** at:
www.esinspection.net/pdf/Safety_Alerts/07-03-AL.pdf

- For additional articles on health and safety issues go to the ***It's Your Health*** web section at:

www.healthcanada.gc.ca/iyh

You can also call toll-free at
1-866-225-0709
or TTY at 1-800-267-1245*