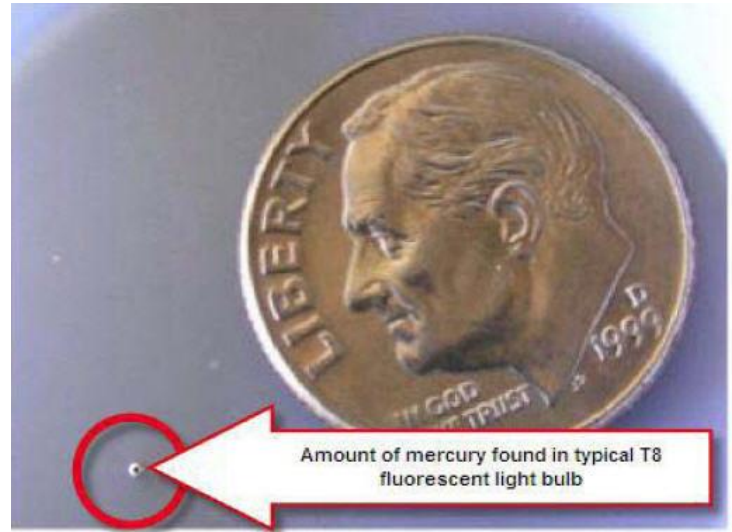


Clean-Up Procedures for Broken Fluorescent Lamps

Fluorescent bulbs contain an extremely small amount of elemental mercury, typically between 2 and 5 milligrams in the most common four-foot tube used on campus and about the same for most compact fluorescent lamp (CFL) bulbs. When subjected to an electrical field, mercury generates ultraviolet radiation that is converted to visible light when it contacts phosphor compounds that coat the interior bulb surfaces. When broken, mercury vapors may be released into the air. The mercury released from broken bulb is mostly in vapor form. Though the amount of mercury released from a broken tube or CFL is small, proper disposal of the broken tube or CFL and minimization of personal exposure are necessary.



Maintenance and housekeeping staff are considered qualified to clean up residues from broken fluorescent bulbs if they follow the procedures outlined below. The Department of Environmental Safety, Sustainability and Risk may be contacted for consultation and assistance.

The highest potential mercury vapor exposure from damaged bulbs or CFLs occurs immediately after breakage. The most effective way to protect yourself and room occupants from vapor exposure is to ventilate the room with outside air (if possible) and keep people out of the room for at least 15 minutes after breakage while airborne concentrations decrease.

Mercury Facts

Mercury is naturally occurring and is commonly found in thermometers, gauges, barometers, thermostats, lamps, and batteries. It is also used in pigments, preservatives and in amalgam fillings for dentistry.

High mercury exposure results in permanent nervous system and kidney damage.

Much of the mercury vapor originally inside a bulb converts to mercury oxide that adheres to the glass.

17% - 40% of elemental mercury in a fluorescent bulb is released into the air the first two weeks after breaking.

Replacing Fluorescent Bulbs

Safety glasses must be worn during removal or installation of fluorescent tubes to prevent damage to eyes if the bulb breaks. If the bulb breaks, leave the area for 15 minutes and (if possible) ventilate by opening exterior doors or windows. Restrict entry into the immediate area and follow cleanup procedures.

Mercury Facts

A 1/2 gram droplet of mercury requires more than one year to completely evaporate at room temperature.

The current OSHA permissible exposure limit for mercury is a ceiling (maximum) exposure of 0.1 mg mercury per cubic meter of air.

A standard four foot long T8 fluorescent bulb has a mercury vapor concentration of 5 mg/118 in³.

If mercury vapor from a broken bulb is immediately dispersed into a 10' X 10' room with 8' ceilings, the concentration would be 0.22 mg/m³.

Clean Up Procedures

- 1) If you discover a fluorescent bulb that was previously broken, you may presume that mercury vapor concentrations are sufficiently low to begin cleanup immediately. If you respond to a service request for a bulb that was just broken or if you are in a room where the bulb breaks, ventilate and leave the room. Have others in the room leave until cleanup is completed, making sure that no one walks through the area of broken glass.
- 2) Assemble cleanup materials (safety glasses, gloves, stiff paper or cardboard pieces, empty cardboard box, disposal bags, duct tape, damp paper towels or disposable wet wipes).
- 3) Wear safety glasses to protect against glass shards, and disposable gloves to prevent skin contact with mercury. Scoop up broken glass shards with pieces of stiff paper or cardboard and place in disposal bag. Large bulb pieces may be carefully picked up by hand and placed in the bag. Work from the outer areas of debris inward to avoid stepping on residues and broken glass.
- 4) Use duct tape to pick up glass shards/residues from surfaces, and place in bag. Wipe hard surfaces clean with damp paper towels or wet wipes, and place in bag.
- 5) Vacuum cleaners used for cleanup of broken lamps on carpet and other floor surfaces must be HEPA-filtered. The bag must be removed immediately after use and disposed with other contaminated materials. Do not use a broom/dustpan as it would similarly need to be disposed immediately after cleanup.
- 6) When cleanup is complete, carefully remove gloves and place in disposal bag. Seal the bag with tape, place into a second bag, and seal the outer bag with tape. Place the bagged material into a cardboard box and label it "Hazardous Waste" and "Used Broken Lamps". Place the labeled box in a secured storage area such as a housekeeping closet.
- 7) Wash your hands afterwards with soap and water.
- 8) Call the Department of Environmental Safety, Sustainability and Risk (301.405.3960) for removal of the cleaned up material (e.g., Please pick up box with a broken fluorescent lamp at Centerville Hall, Room 0106.)

As with many hazardous materials, immediate response to contamination of skin and clothing is necessary. Employees who contaminate themselves due to bulb breakage should follow these instructions:

1. Immediately move several feet away from the breakage location to assess personal contamination.
2. In an area that can be easily cleaned, carefully shake broken glass and lamp residue from your body and clothing.
3. Ventilate and isolate area as described in this document.
4. Proceed to cleanup this area as described in this document.
5. Contact Supervisor to report exposure.
6. Skin surfaces should be flushed with water. Consider changing contaminated clothing if most of the bulb contents fell on the employee. Contaminated clothing should not be brought home for laundering, and may need to be packaged and disposed as hazardous waste. If uncertain, contact ESSR for advice.

ESSR Staff Are Always Your Resource for Information and Assistance

Employees may encounter situations or conditions that they believe require attention from environmental professionals at the Department of Environmental Safety, Sustainability and Risk. ESSR staff are available 24/7 and will respond to calls from maintenance and housekeeping personnel. Contact ESSR at 301.405.3960 during normal business hours, or contact the Department of Public Safety Dispatch at 301.405.3555 to request assistance from the on-call Environmental Affairs responder.