

## ADVISORY NO. 7.5: MANAGEMENT OF UNIVERSAL WASTES

The following recommendations are based on the Ohio Revised Code (ORC), Ohio Administrative Code (OAC) and Ohio EPA guidelines regarding universal waste management.

### UNIVERSAL WASTE MANAGEMENT DEFINITION

All universal wastes (UW) are hazardous wastes that can be managed in a manner following simple rules in place of the more complex hazardous waste requirements. The UW rules have been developed to promote recycling and to ensure proper disposal by relaxing some of the regulatory requirements. This ensures these materials end up at certified recycling facilities and not in the regular trash. If a facility is not going to manage a UW under these relaxed regulations then the materials *must* be managed according to the applicable hazardous waste regulations. This guidance is intended to help identify and properly manage universal wastes.

### TYPES OF UNIVERSAL WASTE:

The following are the four categories of UW that may be managed under the UW rule in Ohio:

#### **Lamps:**

This category includes hazardous waste lamps that meet the definition in OAC rule [3745-50-10\(A\)](#). Lamps are defined as the bulb or tube portion of an electric lighting device. A lamp is designed to produce radiant energy, most often in the ultraviolet, visible and infra-red regions of the electromagnetic spectrum. Lamps can exhibit the toxicity characteristic for some heavy metals (i.e., mercury, lead, cadmium). Examples of universal waste lamps include incandescent, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium and metal halide lamps.



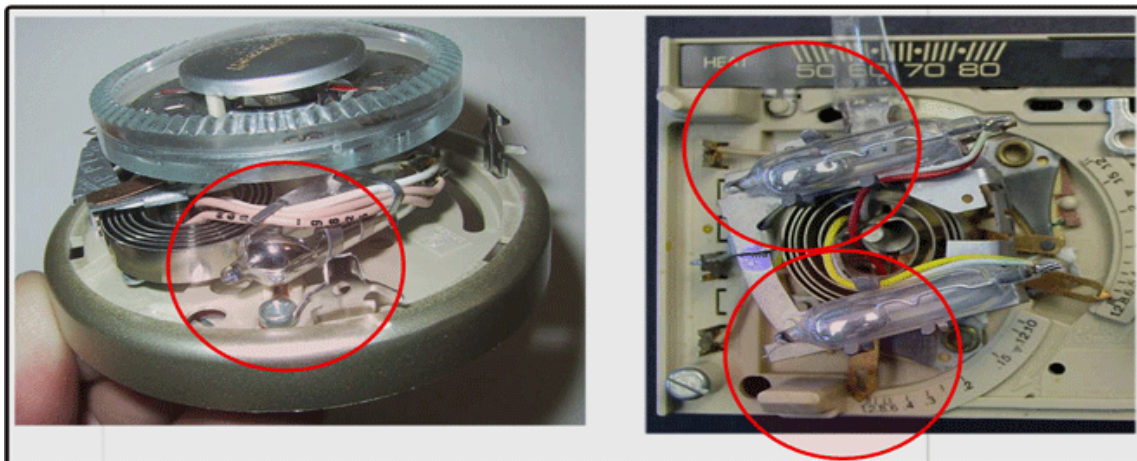
**Discarded Batteries:**

This category includes hazardous waste batteries such as nickel-cadmium and lithium ion batteries as well as spent lead-acid batteries. The handler has the option of managing discarded lead-acid batteries under OAC Chapter [3745-273](#) (the Universal Waste Rule), or OAC rule [3745-266-80](#). UW batteries are defined in OAC rule [3745-50-10\(A\)](#) and OAC rule [3745-273-09](#) as devices consisting of one or more electrically connected electrochemical cells that are designed to receive, store and deliver electric energy. An electrochemical cell is a system consisting of an anode, cathode, and an electrolyte, plus such connections (electrical and mechanical) as may be needed to allow the cell to deliver or receive electrical energy.



**Mercury-Containing Thermostats:**

This category includes mercury-containing thermostats that fail the Toxicity Characteristic Leaching Procedure (TCLP). The TCLP is a procedure used to determine whether a waste exhibits the hazardous waste characteristic for toxicity. Mercury-containing thermostats are temperature control devices that contain metallic mercury in an ampule attached to a bimetal sensing element, and mercury-containing ampules removed from temperature control devices in compliance with the UWR.



### Mercury Facts #1

- Mercury is a naturally occurring metal and is commonly used 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.
- A ½ gram droplet of mercury requires more than one year to completely evaporate at room temperature.

### Pesticides:

This category includes hazardous waste pesticides that are either suspended and/or recalled under Section 6 of the Federal Insecticide, Fungicide and Rodenticide Act (*FIFRA*), suspended or cancelled as part of a voluntary recall by the registrant or collected in waste pesticide programs.

## UNIVERSAL WASTE MANAGEMENT HANDLING REQUIREMENTS

UW handlers are classified as small or large UW handlers based on the quantity of UW accumulated at any time:

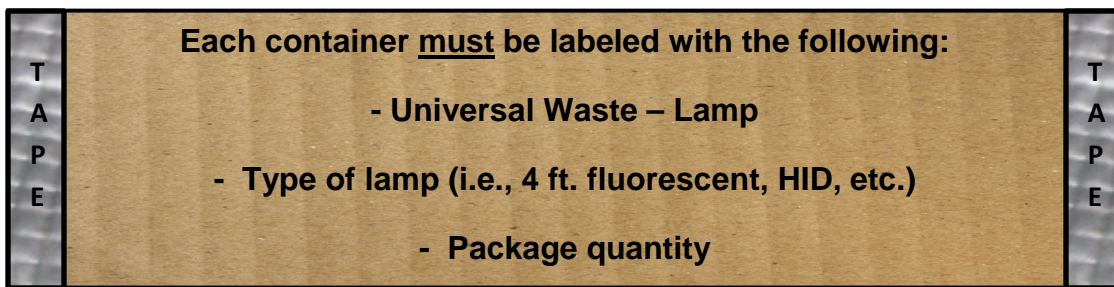
- Small quantity handlers (accumulate less than 5,000 kilograms [11,023 pounds] of UW [not by type] at any time), or
- Large quantity handlers (accumulate more than 5,000 kilograms [11,023 pounds] of UW [not by type] at any time).

### Proper Management for Handlers

#### Fluorescent Lamps:

Small and large quantity UW handlers are prohibited from crushing their lamps. Crushing lamps is prohibited under the UWR except at permitted destination facilities. If they exhibit a characteristic of a hazardous waste, crushed lamps must be managed as a hazardous waste.

All fluorescent lamps must be packaged to minimize breakage. Containers must be designed to contain potential releases due to breakage. Some examples of acceptable packaging include double- or triple-ply cardboard containers with closed lids or packaging in which new lamps are shipped from the manufacturer. It is the responsibility of the generator to obtain appropriate containers. Containers that hold any amount of used fluorescent lamps must remain closed at all times and must be stored in a designated accumulation area. Have all boxes taped securely prior to removal. All lamp disposal/recycling activities shall be coordinated through the University of Cincinnati Environmental Health and Safety (EH&S) Office.



This can be accomplished using the label referenced in [Appendix A](#). Please contact EH&S to obtain these labels.

### Mercury Facts #2

- The current OSHA permissible exposure limit for mercury is a ceiling (maximum) exposure of 0.1 mg mercury per cubic meter of air.
- 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/m<sup>3</sup>.
- 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.

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 personnel are considered qualified to clean up residues from broken fluorescent bulbs if they follow the procedures outlined below. The Department of Environmental Health and Safety 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.

For detailed clean-up procedures for broken fluorescent lamps please see [Appendix B](#) of this advisory.

### **Batteries:**

Batteries that show evidence of leakage, spillage or damage that could cause leakage must be containerized. The container must be closed, structurally sound, compatible with the contents of the battery and lack evidence of leakage or spillage. Do not mix battery types, only chemically compatible battery types should be packed in the same package. Ensure that all exposed terminals are protected by properly insulating the terminals of the batteries using tape or packaging them in individual plastic bags. Clear tape is preferred so that battery identification is still possible. Please contact EH&S for guidance and to obtain proper containers.

### **Mercury-Containing Thermostats:**

Small and large quantity handlers may remove mercury-containing ampules from thermostats provided that the ampules are removed in a manner designed to prevent breakage. Removed ampules only over or in a containment device (tray or pan sufficient to contain any mercury released from an ampule in case of breakage). A mercury clean-up system must be available to immediately transfer any mercury resulting from spills or leaks from broken ampules, from the containment device to a container. Any mercury resulting from spills or leaks should immediately be transferred from the

containment device into non-leaking containers. The containers must be in good condition and closed upon placement of the spill material. The area in which ampules are removed must be well-ventilated and monitored to ensure compliance with all applicable OSHA exposure levels for mercury. The employees removing ampules should be thoroughly familiar with proper waste mercury handling and emergency procedures, including transfer of mercury from containment devices to appropriate containers. Store removed ampules in closed, non-leaking containers that are in good condition and are packaged with materials adequate to prevent breakage during storage, handling and transportation. Please contact EH&S for guidance and to obtain proper containers.

**Pesticides:**

Small and large quantity UW handlers must manage pesticides in containers that remain closed, are structurally sound, compatible with the pesticide and lack evidence of leakage, spillage or damage that could result in a spill. Please contact EH&S prior to disposing of pesticides.

APPENDIX A

UNIVERSAL WASTE RECYCLING LABEL		
UNIVERSITY OF CINCINNATI - ENVIRONMENTAL HEALTH AND SAFETY		
INSTRUCTIONS: FILL OUT LABEL COMPLETELY, ATTACH ONE LABEL PER BOX / CONTAINER OF UNIVERSAL WASTE TO BE RECYCLED. CALL EH&S AT 556-4968 IF YOU HAVE ANY QUESTIONS.		RECORD # UW
NAME	BUILDING	PHONE #
SUPERVISOR	DEPARTMENT	DATE
<b>WASTE LAMPS - CHECK TYPE</b> <input type="checkbox"/> FLUORESCENT, 4FT. & UNDER <input type="checkbox"/> FLUORESCENT, OVER 4 FT. <input type="checkbox"/> FLUORESCENT, U-TUBE & CIRC. <input type="checkbox"/> HID (Mercury vapor, High Pressure Sodium, Metal Halide & HID) <input type="checkbox"/> OTHER (specify below) _____	<b>OTHER UW - CHECK TYPE</b> <input type="checkbox"/> WASTE BATTERIES Type _____ <input type="checkbox"/> WASTE PESTICIDES <input type="checkbox"/> WASTE Hg THERMOSTATS	<b>TOTAL QUANTITY IN BOX / CONTAINER</b>  _____
SEND WHITE COPY TO M.L. 0218, ATTACH GREEN COPY TO BOX / CONTAINER, RETAIN BLUE		

Please contact EH&S to obtain these labels.

## APPENDIX B

### Clean-Up Procedures for Broken Fluorescent Lamps

- 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, dampened 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. Don't 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 "Used Broken Lamps". Place the labeled box in a secured storage area such as a storage closet
- 7) Wash your hands afterwards with soap and water.
- 8) Call Environmental Health Safety at 556-4968 to schedule a time to deliver the container to the EH&S bulb storage location.

If you require more information please visit here:

[US EPA directions for cleaning up broken fluorescent lamps](#)