




QUARTERLY SPECIAL REPORT

THE FIVE UNIVERSAL WASTES

*KEEPING EMPLOYEES AND
THE ENVIRONMENT SAFE*



ENVIRONMENT



Every organization creates waste in the course of doing business. While solid, non-hazardous waste is easily managed and typically regulated at the state or municipal level, rules concerning waste that is hazardous to human health and the environment can make compliance more complex. However, EPA has created regulations that streamline the management of certain types of hazardous waste that are commonly generated by a wide variety of businesses. These are known as “universal wastes.”

It’s hard to conceive of a company that would not handle at least some universal waste — including yours. That’s why every organization’s environment, health, and safety (EHS) team should have a good understanding of their universal waste streams and how to properly manage them.

This whitepaper will cover the five types of federal universal waste, along with tips for safely handling them so you can protect your employees and the environment.

WHAT IS CONSIDERED “UNIVERSAL WASTE”?

EPA’s federal universal waste regulations are outlined in Title 40 of the Code of Federal Regulations (CFR), part 273, and they apply to five specific types of universal waste:



Batteries



Mercury-containing equipment



Lamps



Aerosol cans



Pesticides

Organizations that adhere to the universal waste regulations must manage and store these materials in a way that prevents releases to the environment. Universal wastes do not need to be counted toward an organization’s hazardous waste generator category totals (i.e., very small quantity generator (VSQG), small quantity generator (SQG), or large quantity generator (LQG)) under the Resource Conservation and Recovery Act (RCRA).



In the universal waste system, there are four types of regulated participants:

- ▶ Small quantity handlers of universal waste (SQHUWs) that accumulate less than 11,000 pounds (5,000 kilograms) of universal waste at any time during a year.
- ▶ Large quantity handlers of universal waste (LQHUWs) that accumulate 11,000 pounds (5,000 kilograms) or more total universal waste at any time during a year.
- ▶ Universal waste transporters.
- ▶ Universal waste destination facilities.

A hazardous waste manifest is not required for shipping universal waste, but regulations do require that the waste be sent to either a recycler or a permitted hazardous waste disposal facility. Generally, these materials may be stored for a year prior to shipment off site.

If you are a SQHUW or LQHUW that transports your universal waste to a destination facility, then you are also regulated as a universal waste transporter.





DON'T FORGET TO CHECK STATE REGS!

As is the case with most environmental legislation, universal waste programs vary depending on the state. Most states have adopted the complete federal universal waste program. However, a state does not need to include all of the federal universal wastes when they adopt the universal waste regulations. States can create different standards for universal waste altogether, except for batteries which are covered under the Mercury Containing and Rechargeable Battery Management Act of 1996. Check your state laws for the adoption status of various federal universal waste rules; for example, while pesticides are included in the federal universal waste program, they are not considered universal waste in some states, including California, Maine, and Washington.

On the flip side, some states allow for additional materials beyond the five outlined at the federal level to be managed as universal wastes. For example:

- ▶ **ANTIFREEZE** is a universal waste in the states of Louisiana, Michigan, Nevada, New Hampshire, Ohio, Utah, and Wisconsin.
- ▶ **CATHODE RAY TUBES (CRTs)** are an additional universal waste stream in California, Maine, New Hampshire, Rhode Island, and Vermont.
- ▶ **PAINT AND PAINT-RELATED WASTES** can be managed as universal wastes in Texas and Ohio.
- ▶ **ELECTRONICS** are considered universal waste in many states, including Arkansas, California, Colorado, Connecticut, Louisiana, Michigan, Nebraska, and New Jersey.
- ▶ **PHARMACEUTICALS** may be considered universal waste in Michigan and Florida.

This is not an exhaustive list — other items such as ballasts, barometers, compressed gas cylinders, and even solar panels have status as additional universal wastes in some states. Review the rules in your state to see what other limitations, and potential opportunities, apply to your organization's universal waste management program.



KEEPING EMPLOYEES — AND THE ENVIRONMENT — SAFE DURING UNIVERSAL WASTE ACCUMULATION

The five federal universal wastes share several similarities in their proper management (including storage to prevent release and proper labeling of containers), but each waste poses unique hazards to employees and the environment. With a little bit of due diligence, however, these hazards can be effectively controlled.

Let's take a look at each waste, along with some key environmental and safety best practices to remember.

1. BATTERIES

It's hard to imagine a modern home or business that doesn't include batteries in its day-to-day functioning. The universal waste regulations define a battery as a device consisting of one or more electrically-connected electrochemical cells which is 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. The term "battery" also includes an intact, unbroken battery from which the electrolyte has been removed.

Many different types of batteries meet these definitions, and not all of them are universal wastes. Some are non-hazardous and can be managed as regular solid waste, while others must be recycled (as always, check the laws in your state). Some battery types include:

- ▶ **LEAD-ACID BATTERIES.** These are commonly used in vehicles and while they can be managed as universal waste, they also may be managed under 40 CFR Part 266, Subpart G for reclamation purposes.
- ▶ **NICKEL-CADMIUM (NICD) BATTERIES.** NiCd batteries are prohibited from disposal in landfills under federal rules and many states have placed similar landfill bans as well. These batteries must be collected and recycled.
- ▶ **LITHIUM-ION (LI-ION) BATTERIES.** The demand for these batteries has increased a great deal in recent years for their wide usage in electronics, and while not all Li-ion batteries meet the definition of hazardous waste, organizations may manage them as universal waste for simplicity's sake.





Organizations may sort their universal waste batteries by type or mix them together, but any battery that is leaking or damaged should be separated from the others, securely contained, and properly disposed.

Containers holding universal waste batteries must be clearly marked or labeled with any of the following phrases:

- ▶ Universal Waste — Battery(ies),
- ▶ Waste Battery(ies), or
- ▶ Used Battery(ies).

In its 2021 report *An Analysis of Lithium-ion Battery Fires in Waste Management and Recycling*, EPA found that between 2013 and 2020,

64 WASTE FACILITIES
EXPERIENCED **245** FIRES

that were caused by (or likely caused by) lithium metal or lithium-ion batteries. The fires occurred in 28 states across all 10 EPA Regions.

Tips for Safe Handling of Universal Waste Batteries

- ▶ **STORE IN A STURDY, PLASTIC CONTAINER WITH A LID.** Never use a metal container! Storing batteries in a metal bin could cause a fire. Always keep the container closed when not adding or removing batteries.
- ▶ **IN ADDITION TO THE LABELS NOTED ABOVE, MARK THE CONTAINER WITH THE DATE THE FIRST BATTERY WAS PLACED INSIDE.** Universal waste can be stored for up to one year — this date will ensure you ship your batteries to a disposal facility or recycler on time.
- ▶ **PREVENT SHORT CIRCUITING AND MITIGATE THE ASSOCIATED FIRE HAZARDS.** There are several options for this:
 - Place tape over battery terminals,
 - Store batteries in individual plastic bags,
 - Pack batteries so their terminals cannot come into contact, or
 - Remove the charge from the battery per the manufacturer's directions.
- ▶ **IF BATTERIES ARE SWOLLEN, LEAKING, OR DAMAGED, PUT THEM IN A SEPARATE CONTAINER FULL OF SAND OR KITTY LITTER AND DISPOSE OF THEM PROPERLY.** Do not leave them in the same container as your other universal waste batteries.
- ▶ **TRAIN EMPLOYEES.** Any personnel who handle universal waste must receive the appropriate training on the safe handling of the universal waste and in how to clean up spills and respond to emergencies.
- ▶ **HAVE SPILL KITS ON HAND.** Keep spill kits nearby in case of any accidental releases.



WHAT SHOULD BE IN YOUR SPILL KITS?

The contents of spill kits will vary depending on the unique needs of your operations as well as the type of universal waste(s) stored on the premises, but several key items are typically included. These are:

- ▶ Materials and/or kits to patch or plug leaks in containers;
- ▶ Loose material such as sawdust, sand, or kitty litter that will act as an absorbent when placed on a spill;
- ▶ Absorbent towels, wipes, pads, or mats;
- ▶ Covers for storm drains, as well as booms that float on water and/or other barriers such as temporary dikes, berms, or curbing;
- ▶ Any necessary tools, such as brooms, mops, scoops, shovels, scrapers, or squeegees;
- ▶ Any necessary tools, such as brooms, mops, scoops, shovels, scrapers, or squeegees;
- ▶ Acid and base neutralizers, plus any necessary environmental monitoring equipment;
- ▶ Salvage bags, buckets, or drums to contain collected spill material;
- ▶ Signage, hazard tape, and any necessary tags or labels, plus communication equipment such as a radio or cell phone (accompanied by appropriate phone numbers/radio channels or frequencies);
- ▶ Medical and first-aid supplies; and
- ▶ Appropriate personal protective equipment (PPE), which may include gloves, goggles, face shields, boots, footwear covers, and/or respirators.



2. LAMPS

Unless your employees are working in the dark (which would present a whole laundry list of other safety issues), you use lamps at your organization — and many of these lamps are covered under the universal waste program. While incandescent bulbs can be managed as solid, non-hazardous waste, a great deal of modern lighting employs lamps that contain mercury or other hazardous elements and/or gases.

Defined as “the bulb or tube portion of an electric lighting device,” common examples of universal waste lamps include:

- ▶ Fluorescent
- ▶ Compact fluorescent lights (CFLs)
- ▶ High intensity discharge
- ▶ Mercury vapor
- ▶ Neon
- ▶ High pressure sodium
- ▶ Metal halide





Some lamps, often referred to as “green-end cap bulbs,” contain lower amounts of mercury and may not test as hazardous material covered by federal regulations. However, any waste should be considered hazardous waste until proven otherwise. You may find it easier to just manage and recycle green-end cap bulbs as universal waste even if there is a chance the lamp would test as non-hazardous

WHAT ABOUT YOUR LEDs?

Light-emitting diode (LED) bulbs do not contain mercury, and therefore EPA allows them to be disposed of the same way as incandescent bulbs (i.e., as solid non-hazardous waste). But it’s worth noting that some LED components can be recycled — contact your local waste agencies for details on how to take this more environmentally-friendly route for disposing of LEDs.

As with batteries, you must clearly mark or label containers holding universal waste lamps with one of the following appropriate phrases (as well as the earliest accumulation date to ensure timely shipping off site):

- ▶ Universal Waste — Lamp(s),
- ▶ Waste Lamp(s), or
- ▶ Used Lamp(s).

Some facilities use lamp crushing devices to manage their universal waste, but check your state regulations before pursuing this option. Many states prohibit the practice, and others require permitting.

Tips for Safe Handling of Universal Waste Lamps

- ▶ **STORE USED LAMPS IN CONTAINERS THAT ARE STRUCTURALLY SOUND AND ADEQUATE TO PREVENT BREAKAGE.** For convenience, many organizations save the original lamp packaging for this purpose, and extra packing materials can be added to provide cushioning and prevent movement within the greater universal waste container.
- ▶ **THE CONTAINERS MUST BE ABLE TO BE CLOSED AND REMAIN CLOSED EXCEPT WHEN ADDING/ REMOVING WASTE LAMPS.** This requirement is often overlooked and often cited.
- ▶ **INFORM AND TRAIN EMPLOYEES ON THE HANDLING OF UNIVERSAL WASTE LAMPS.** Training on proper management can prevent breakage and associated hazardous releases.



► **IN THE EVENT OF LAMP BREAKAGE, TAKE PROPER STEPS FOR CLEANUP.** Universal waste handlers, small or large, must immediately contain releases such as lamp breakage. Once a lamp is broken, it is no longer universal waste and must be cleaned up and disposed of separately. Mercury vapor may also be released into the air, so proper cleanup is essential. In the event of a break, take the following steps:

- Have personnel leave the room and steer clear of the breakage.
- Shut down the central forced air HVAC system to the area, allow fresh air into the room, and air out the area for 5 to 10 minutes. When proceeding with cleanup, it is best to wear respiratory protection.
- Use stiff paper or cardboard to collect large glass fragments and powder, then use sticky tape to collect any remaining small debris.

- Wipe the area with damp paper towels or disposable wipes, and place all debris and cleanup materials in a sealable plastic bag or a glass jar with a metal lid.
- Vacuuming may actually spread mercury powder or vapor, so do not vacuum up a broken bulb unless glass fragments remain after all other cleanup steps have been taken. If you must vacuum, remove the bag or remove the debris from the canister and seal in a plastic bag.
- Dispose of all cleanup materials and debris in an outdoor container or other hazardous waste area, and ensure you follow all the requirements for your hazardous waste generator category during disposal.
- Continue to air out the room and keep the HVAC system shut off for several hours after cleanup, and wash hands with soap and water after handling bulb debris and cleanup materials.



3. PESTICIDES

A pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant, or desiccant — and only certain pesticides are eligible for management as a universal waste.

These eligible pesticides are:

- ▶ Recalled pesticides that are suspended or canceled and part of a voluntary or mandatory recall under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); or
- ▶ Unused pesticide products that are collected and managed as part of a waste pesticide collection program.

A recalled pesticide becomes a waste when the generator of the recalled pesticide agrees to participate in the recall and the person conducting the recall decides to discard the pesticide; and an unused pesticide product becomes a waste on the date the generator decides to discard it.

As with all other universal wastes, pesticides must be managed in a way that prevents any releases into the environment and must be shipped to another universal waste generator or permitted disposal facility within one year.



***REMEMBER TO CHECK YOUR
STATE REGULATIONS!***

**Not all states recognize
pesticides as universal wastes.**

Tips for Safe Handling of Universal Waste Pesticides



- ▶ **USE THE RIGHT TYPE(S) OF CONTAINERS, AND PLACE THEM ON PALLETS OR CONTAINMENT UNITS INSTEAD OF DIRECTLY ON THE FLOOR.** Universal waste pesticides may be contained in:
 - A closed container that is structurally sound, compatible to the pesticide it will contain, and shows no evidence of leaking, spilling, or other damage that could result in a release;
 - A tank that meets the requirements outlined in 40 CFR 265 Subpart J; or
 - A transport vehicle or vessel that is structurally sound without evidence of leaks, spills, or damage that is compatible with the pesticide.
- ▶ **PROPER MARKING AND LABELING ARE ESSENTIAL.** In addition to marking the universal waste container with the words “Universal Waste — Pesticide(s)” or “Waste — Pesticide(s),” the label that was on or accompanied the pesticide product must also be affixed to the container, tank, transport vehicle/vessel, or multiple container package unit. It is for this reason that it may be easier to store universal waste pesticides in their original, labeled containers; otherwise, the label must be transferred to any new container. If using the original label is unfeasible, you may use:
 - The appropriate label as required under the Department of Transportation regulation 49 CFR Part 172; or
 - Another label prescribed or designated by the waste pesticide collection program administered or recognized by your state.

- ▶ **STORE WASTE PESTICIDES AT A PROPER TEMPERATURE IN A WELL-VENTILATED, DRY AREA.** In most cases, temperatures should remain between 40°F and 100°F to prevent freezing or expansion of the pesticide, which can damage its container or present a fire or explosion hazard. Clean up any spills immediately, and vent any vapors to the outside (rather than to other indoor areas).
- ▶ **KEEP WASTE PESTICIDES SEPARATED FROM OTHER PRODUCTS AND ACTIVITIES, AND INFORM EMPLOYEES WITH SIGNAGE.** Pesticides must be kept separate from cleaning supplies, food, medicine, gasoline, seed, or flammable materials, and no smoking, eating, or drinking should be allowed around pesticides. Post warning signs to ensure employees keep to these restrictions.

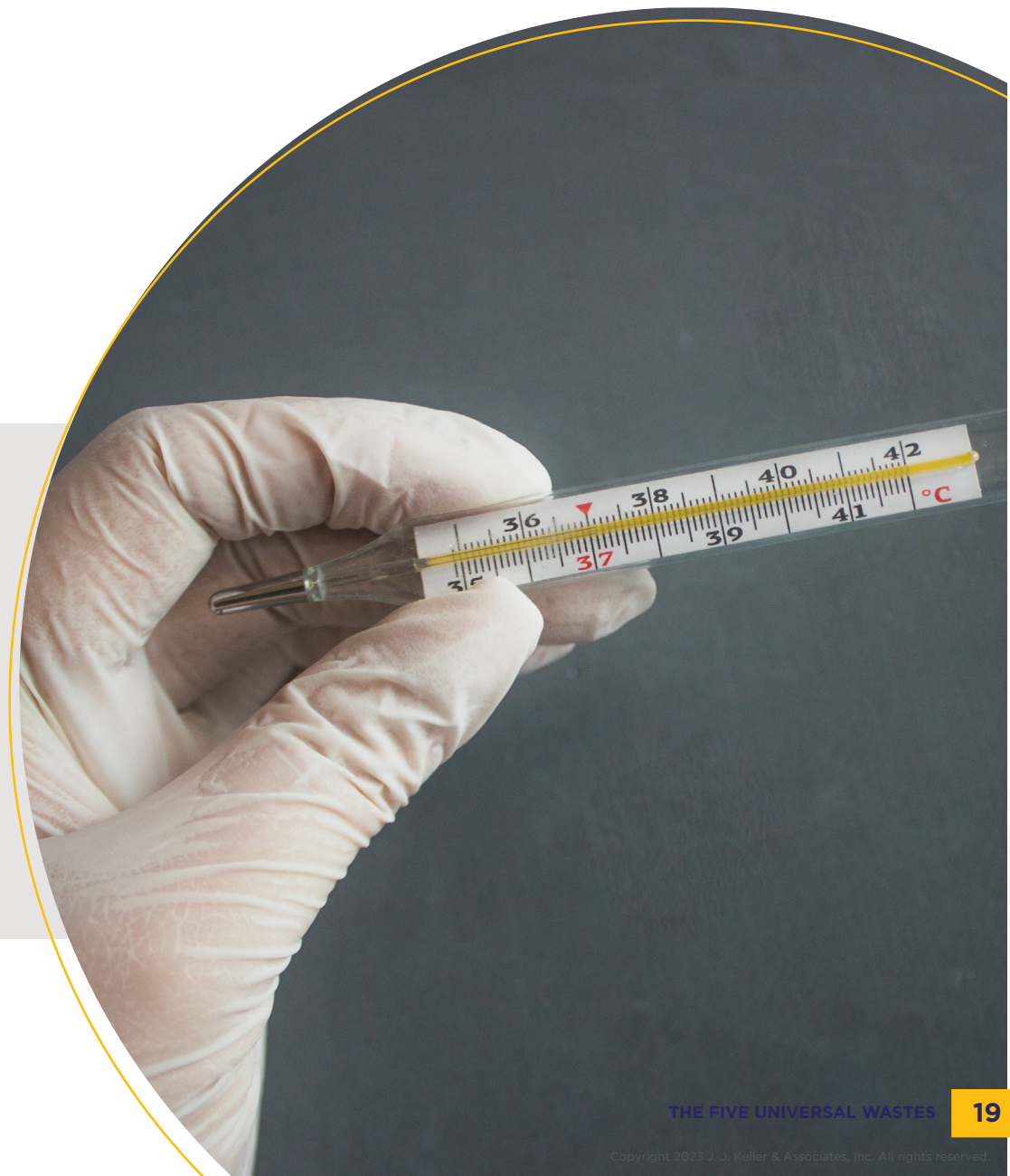


4. MERCURY-CONTAINING EQUIPMENT

The universal waste regulations define mercury-containing equipment as “a device or part of a device (including thermostats but excluding batteries and lamps) that contain elemental mercury integral to its function.” Elemental mercury is a hazardous neurotoxin, and most of this equipment is constructed so that the mercury does not pose an immediate danger to employee health or the environment. However, it must still be managed carefully to avoid any breakage that would result in a release of mercury.

Common examples of this category of universal waste include:

- ▶ Thermometers,
- ▶ Thermostats,
- ▶ Manometers,
- ▶ Barometers,
- ▶ Temperature and pressure gauges, and
- ▶ Mercury switches (e.g., light switches in cars and other vehicles).



Be sure to check your state's regulations regarding mercury-containing equipment, as there are differences between regions. For example, some states only allow thermostats to be handled as a universal waste.

Mercury-containing equipment must be stored in a closed, structurally sound container that is compatible with the material to be stored and must be clearly marked or labeled. Any of the following phrases are appropriate for a label:

- ▶ Universal Waste — Mercury-Containing Equipment,
- ▶ Waste Mercury-Containing Equipment, or
- ▶ Used Mercury-Containing Equipment.

If your collection of this particular universal waste holds only mercury-containing thermostats, you may substitute “Mercury Thermostat(s)” in lieu of “Mercury-Containing Equipment” in the above phrasings.





Tips for Safe Handling of Mercury-Containing Equipment

- ▶ **LOCATE AND INVENTORY ALL MERCURY-CONTAINING EQUIPMENT AT YOUR FACILITY.** When taking inventory, note that you should assume that all thermostats contain mercury until proven otherwise.
- ▶ **KEEP A MERCURY SPILL CLEANUP KIT NEARBY AND AT THE READY.** Also identify areas where a mercury release would create an emergency (e.g., drinking water supply, surface water, or air-circulating or HVAC equipment/systems) and store your universal waste mercury-containing equipment as far away from these areas as possible.
- ▶ **TRAIN AFFECTED PERSONNEL.** You must train employees who will handle this waste on how to safely manage mercury-containing equipment, how to respond to potential spills, and how to safely dispose of or ship the material off site within one year.
- ▶ **GO MERCURY-FREE, IF POSSIBLE.** When equipment containing mercury components is no longer in good working order and becomes waste, replace it with a mercury-free alternative if such equipment exists and if its adoption is economically feasible for your business.

5. AEROSOL CANS



Aerosol cans (non-empty ones, to be precise) are the latest addition to the federal universal waste program, with their inclusion finalized by the EPA in late 2019. While some states have not adopted aerosol cans into their universal waste programs, several states (including California, Colorado, New Mexico, Ohio, and Utah) already allowed aerosol cans to be managed as universal waste even before promulgation of the federal rule.

By adding aerosol cans to the universal waste program, EPA expects to promote the collection and recycling of aerosol cans, in turn reducing the quantity of this waste ending up in municipal solid landfills or incinerators. It is also expected to ease regulatory burdens, as aerosol cans are a commonly generated hazardous waste, especially in the retail sector. As with the other universal wastes described above, non-empty aerosol cans may be stored on the premises for up to one year from the first accumulation.

An aerosol can is defined as a non-refillable receptacle containing a gas compressed, liquefied, or dissolved under pressure, the sole purpose of which is to expel a liquid, paste, or powder and fitted with a self-closing release device allowing the contents to be ejected by the gas. Frequently, flammable propellants within aerosol cans also contribute to their status as hazardous waste.

Clearly label your structurally-sound containers that store universal waste aerosol cans with one of the following phrases:

- ▶ Universal Waste — Aerosol Can(s),
- ▶ Waste Aerosol Can(s), or
- ▶ Used Aerosol Can(s).

WHAT ABOUT EMPTY CANS?

If aerosol cans are “RCRA empty” as defined in 40 CFR 261.7, they may be exempt from hazardous waste regulations and recycled the same as non-hazardous scrap metal. However, empty aerosol cans may still be managed as universal waste if it’s more convenient for the handler.



Tips for Safe Handling of Universal Waste Aerosol Cans

- ▶ **AVOID ACCIDENTAL PUNCTURING AND STORE AT A PROPER TEMPERATURE.** Accidentally puncture or exposure to excessive heat present serious hazards from waste aerosol cans, as the can may burst and release its contents. If the propellant in the can is ignitable, puncturing or bursting presents a fire hazard or may even turn the can into a projectile. Consult the label on the can for proper storage temperatures and eliminate puncture hazards from the inside of your universal waste container.
- ▶ **SEPARATE OUT ANY LEAKING CANS FROM THE REST OF YOUR UNIVERSAL WASTE AEROSOL CANS.** Any aerosol cans that show evidence of leakage must be stored in a separate closed container with absorbents and disposed of in compliance with hazardous waste regulations, or they must be immediately punctured and drained.





► **IF YOU PLAN TO DELIBERATELY PUNCTURE AND DRAIN CANS, DO IT SAFELY.** Some universal waste handlers intentionally puncture and drain cans. These handlers must recycle the empty cans, as well as perform the following:

- Use a device specifically designed to safely puncture aerosol cans and have steps or devices in place to effectively contain the residual contents as well as any emissions.
- Establish and follow a written procedure describing how to safely puncture and drain the can; maintain a copy of the manufacturer's instructions on site; and ensure employees operating the puncturing device are trained in the proper procedures.
- Ensure puncturing is done in a manner to prevent fires and the releases of any component into the environment. Best practices include placing the device on a solid, flat surface and conducting can puncturing in a well-ventilated area.
- Immediately transfer the contents from the waste aerosol can (or the puncturing device, if applicable) to a container or tank that meets your hazardous waste generator requirements.
- Conduct a hazardous waste determination on the contents of the emptied aerosol can. These contents may be subject to all of the applicable hazardous waste regulations, and will count toward the generator's VSQG, SQG, or LQG status. If the contents are not hazardous waste, however, the handler may manage it as a solid waste.
- Put a written procedure in place for response in the event of a spill or leak, and have a spill clean-up kit readily available. Clean up all spills or leaks of the contents of the aerosol can(s) promptly.

SOLVE DAY-TO-DAY CHALLENGES BY MAKING UNIVERSAL WASTE COMPLIANCE CONVENIENT

As many EHS managers know, day-to-day compliance with initiatives such as universal waste management is easier said than done — especially when it comes to getting employee buy-in. Here are a few common challenges related to universal waste, along with ideas for solving them.

► **THE CHALLENGE:** Helping employees identify universal waste in the first place. Since these wastes are quite common and managed differently from other hazardous waste, employees may not as readily understand or recognize the risks, making collection and proper disposal more challenging.

THE SOLUTION: Educate employees on universal waste, incorporate proper handling into health and safety training, and provide on-the-job reminders when mismanagement is observed as well as positive recognition when waste is properly handled.



► **THE CHALLENGE:** Providing the right training to the right employees. While training is a solution, it can also be a challenge. While many employees may handle the waste, their responsibilities beyond (e.g., spill cleanup, emergency response, etc.) may vary greatly and require additional knowledge.

THE SOLUTION: Diversify your training delivery methods to promote engagement, coordinate rotating responsibilities (perhaps in cooperation with your safety committee or through a volunteer program), or take a conservative approach and train all your employees on all aspects of universal waste management.

► **THE CHALLENGE:** Employees cutting safety corners with waste management. It can be difficult enough to keep employees from just throwing universal waste — especially batteries — in the trash, let alone ensuring that they place tape over terminals or individually bag waste.

THE SOLUTION: Make compliance just a little more convenient. Keep bags and tape near universal waste collection containers, or designate specific employees (perhaps with extra training) to collect batteries and other universal waste to ensure proper handling and disposal.



► **THE CHALLENGE:** Some industries (especially retail) may generate universal waste in multiple ways. In a retail environment, universal waste is not only generated by facility operations, but also by the products being sold, complicating collection, disposal, and employee training.

THE SOLUTION: Evaluate not only your facility's potential to generate waste, but also include any product inventories (whether manufactured or sold) in your universal waste plan. Train employees to understand that, for example, a waste battery is a waste battery, whether it comes from their hand-held scanners or a broken appliance no longer fit to be sold.

HEALTHY EMPLOYEES, HEALTHY ENVIRONMENT

While the universal waste program streamlines and simplifies the regulation, management, and disposal of certain hazardous wastes, its goals are no less significant than other EHS initiatives that seek to protect employees and the environment. It can be easy to overlook the fact that employee health is closely tied to the environment. Proper waste management gives you the opportunity to protect both.



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