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Creating a Bulb and Ballast
Recycling Strategy



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Overview

This green paper will explore the recycling of light bulbs and ballasts, including the importance of regulatory compliance and corporate social responsibility.

Thousands of businesses and organizations across the United States face the challenge of proper recycling of bulbs and ballasts. Myths and mis-information about proper recycling are widespread, leading even the most law-abiding business and community leaders to make wrong decisions.

This paper aims to demystify the recycling process and provide accurate information so that your organization can create a bulb and ballast recycling strategy to be proud of.

The Problem

With so much information available, it can be daunting to find accurate information about the best way to recycle bulbs and ballasts.

Close to 700 million fluorescent bulbs and compact fluorescent lamps (CFLs) are thrown out each year in the United States. The Environmental Protection Agency (EPA) predicts that number will increase in the years ahead.

Each lamp that is manufactured contains approximately 3.5 to 15 milligrams of mercury, a highly-toxic element that's been linked to neurological problems, particularly in small children. Humans can be exposed to toxic levels of mercury through food, water, or airborne sources. Across the U.S., mercury pollution has contaminated 18 million acres of lakes, estuaries and wetlands (43 percent of the total), and 1.4 million river miles. In 2008, all 50 states issued fish consumption advisories, warning citizens to limit how often they eat certain types of fish caught in the states waters due to mercury contamination.

But health hazards aren't the only reason to be concerned about proper disposal of incandescent bulbs and CFLs. EPA guidelines strictly regulate the proper disposal of bulbs and ballasts. In 1999, the EPA enacted a lamp disposal regulation, known as the Universal Waste Rule. The EPA's universal waste regulations streamline hazardous waste management standards for federally designated "universal wastes," which include batteries, mercury-containing equipment, bulbs and pesticides.

The regulations govern the collection and management of these widely generated wastes, thus facilitating environmentally sound collection and proper recycling or treatment. Proper recycling not only reduces the release of mercury from spent lamps into the environment, but also allows for the reuse of the glass, metals, and other components of the spent fluorescent lamps.

The Universal Waste Rule allows some flexibility in the collection and storage of lamps prior to disposal and in the transportation of lamps to the lamp recycler. However, it also imposes serious penalties on organizations that fail to properly dispose of their lighting.

The EPA 's regulations pertain to all low mercury and regular 1', 2', 3', 4', and 8' tube, u-shaped bulbs, T12, T8, T5 lamps, exit sign bulbs, compact fluorescents, and high intensity discharge lamps such as parking garage lights, gym lights and street lights.

The Universal Waste Rule instructs businesses to recycle and store their lamps using the following guidelines.

- Designate an area within your facility to store lamps. Storage locations should be away from high-traffic areas; bigger facilities may need more than one location for easier access. The storage areas should be clean, dry, and free of broken lamp debris. Lamps can be stored for up to one year.
- Mark the boxes with one of these labels: "Waste Lamps for Recycling," "Spent Lamps for Recycling," or "Used Lamps for Recycling." Lamp recycler's containers often come pre-labeled.
- Keep broken lamps in a sealed container, and keep the container in a cool place, away from high-traffic areas – preferably outdoors. Containers of broken lamps should not be opened to add or remove broken lamps. Remember – broken lamps contain mercury and may present health hazards.
- Close and secure both ends of boxes/containers with tape. Per DOT regulations, lamps must be packed in a way to minimize breakage from your facility to the recycling facility.
- Educate your employees. Inform your employees about the dangers of mercury, the importance of minimizing the release of mercury, how to safely handle spent lamps, and your decision to recycle all spent fluorescent lamps.
- Record and track data. Simply keep either the bill of lading from the recycling pick-up, the lamp recycler's invoice, or the Certificate of Recycling you receive when your lamps are disposed of.
- Crush lamps only if necessary because of storage limitations.

These tips are meant to get the lamps safely from your facility to the recycling facility. **Remember, mercury is not released when lamps are intact or in use; exposure is possible only when a lamp has been broken.**

That is why all lamp recycling should take place at an EPA licensed recycling facility. At a processor, your lamp storage boxes are opened, and the lamps are fed onto a conveyer belt. The conveyer belt moves the lamps through a large crushing and sieving machine that separates the glass from the aluminum end caps and from the phosphorous powder which contains the mercury. The powder is retorted, which is an intense heating and cooling process. The high temperature vaporizes the mercury, and the cooling process returns it to its liquid state. The end result is 4 re-usable commodities: mercury, aluminum end caps, glass and phosphorous powder.

Companies that fail to comply with EPA regulations can face fines and embarrassment from bad publicity that may result. For example, Walmart in California was fined \$27,600,000 and Target in California was fined \$8,650,000. A waste management company and city landfill in California

were fined \$300,000 each. In Chicago, a recycling company was fined \$743,000 for non-compliance.

Company	Location	Fine
Walmart	California (various)	\$27,600,000
Target	California (various)	\$8,650,000
River Shannon Recycling Mercury Vapor Technologies	Chicago, IL	\$743,000
Chemical Waste Management	Kings County, CA	+\$300,000
Kettleman City Landfill	Kings County, CA	+\$300,000

Beginning a recycling program is generally easy. Most lamp recyclers offer storage containers, employee training, and a variety of recycling program options. Programs are typically determined by the size of the facility, facility location, storage space and the number of spent lamps generated.

The Options Include:

Dedicated Pick-Up: The lamp recycling company will pick up the lamps from your facility. This program offers added service because the driver typically is more knowledgeable about how the lamps should be staged for the pick-up, can assist with re-packaging lamps if needed, and has extra storage containers on the truck.

Common Carrier: A freight company picks up the lamps from your facility and brings them to the recycling facility for processing. The lamps need to be palletized prior to pick-up. The recycling company can make these arrangements.

Mail-In or Box Program: This option is generally more cost-effective if you generate a relatively small amount of spent lamps. In this type of program, a recycler can provide a container to fill with the spent lamps. When the container is full, it can be sent to the recycler via a prepaid ground mail shipment program.

Self-Transport: If you generate a small amount of lamps, have the capacity to transport them, or are located in close proximity to the recycler, you may choose to transport the spent lamps yourself. Lamp recyclers can provide boxes that are designed to reduce breakage during transport to a recycling facility.

Drum Top Crushing: A drum top crusher (DTC) is a machine that sits on top of a 55 gallon drum. The machine sucks in the bulb like a vacuum, and crushes the tube. This practice makes storage of spent fluorescent lamps easier by minimizing their volume. Commercial DTCs are designed to

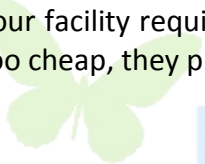
collect a large portion of the mercury that is found in fluorescent lamps. However, DTCs can also create some mercury exposure and handling issues, as ALL DTCs release some mercury during lamp crushing.

The mercury released from a DTC can be so high, that the EPA has a complete set of guidelines for their use. The two most important ones are that a DTC not be used in facilities that serve sensitive populations (schools, health care facilities, nursing homes) and that the DTC operate in a room with a segregated ventilation system from the rest of the facility.

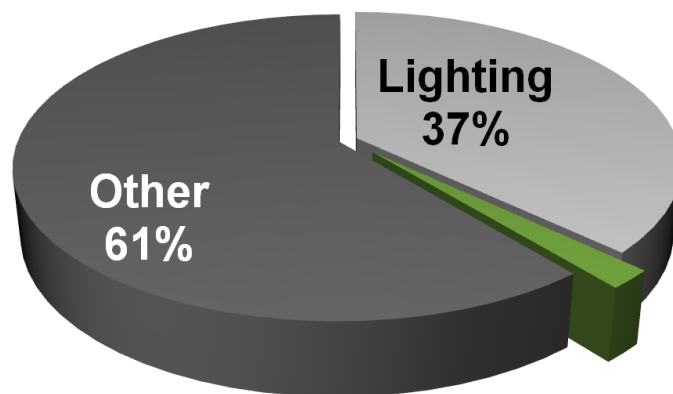
How EverLights Can Solve Your Recycling Problems

Selecting a lamp recycler you can trust is essential. It is incumbent upon you to select a recycling contractor who will best serve your needs while at the same time give you the assurance that your spent lamps are properly managed to minimize your liability. Not all lamp recycling contractors are the same, so here are some tips.

Pricing – Recycling spent lamps is 2% of a facilities annual lighting budget. In other words, recycling lamps is very inexpensive. Because of this, we recommend that you consider pricing last. It is more important for you to partner with a lamp recycler that will give you the service your facility requires, while operating under impeccable recycling standards. If a recycler seems too cheap, they probably are. Complying with regulations and doing things right costs money.



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Service – Important items include responsiveness, timeliness, program flexibility and customization, and the knowledge and assistance of the people you will be working with. They are often resources to help you train your employees.

Risk Management – Recyclers are obligated to reduce or eliminate pollution risks for their clients. In order to remove the mercury from the waste, recyclers must comply with numerous federal and state regulations. Important factors in evaluating recyclers include: their insurance limits; their environmental record; the existence of government permits and approvals for facility operation or transportation; operations of safety procedures and records; how the lamp is recycled; where each component of the lamp goes after the initial recycling.

Conclusion

As long as we continue to rely upon fossil fuels for power generation, light sources containing a minimal amount of mercury for efficient operation will continue to be important in reducing overall mercury emissions.

Mercury-free light source alternatives, particularly LEDs, show promise in the future, but their cost must be dramatically improved to offset the total mercury burden. We are aware of a global mercury contamination. We are aware that fluorescent lighting is a cost effective answer for reducing mercury emissions from our power generation. And we are aware that fluorescent lamps contain mercury. So, complete your lighting environmental stewardship by choosing the right way to recycle your lighting.



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