

Using Fluorescent Lamp Crushing Equipment

Some facilities with large quantities of spent fluorescent lamps are choosing to use fluorescent lamp crushing equipment as a waste management tool. Because of safety concerns, *Ecology recommends facilities recycle fluorescent lamps intact as universal waste.*

Managing lamps as universal waste has many advantages over managing them as dangerous waste. For example, universal waste lamps can be stored up to a year and do not count toward generator status or dangerous waste generation totals. For more information on universal waste management of lamps see [Mercury-containing Lights and Lamps as Universal Waste](#)¹ on [Ecology's website](#)².

This focus sheet describes how dangerous waste regulations apply to facilities that crush spent fluorescent lamps. This information does not apply to businesses that crush non-dangerous waste fluorescent lamps, such as “green” or TCLP³ compliant lamps. Although these lamps are not dangerous waste, Ecology recommends managing them the same as dangerous waste lamps.

Crushing Lamps is Waste Treatment, Not Recycling

The purpose of crushing lamps in a drum top crushing unit (DTC) is to reduce the volume of waste. Ecology does not consider on-site lamp crushing a recycling process, even if the crushed glass is later sent to a recycling facility. This is because recycling involves reclaiming or recovering something of value from a waste. A DTC unit reduces the volume of waste, but does not separate and reclaim the waste as recycling facilities do.

¹ www.ecy.wa.gov/programs/hwtr/dangermat/universal_waste_lamps.html

² www.ecy.wa.gov/ecyhome.html

³ Toxicity Characteristic Leaching Procedure

Why It Matters

All fluorescent lamps contain mercury. Mercury is toxic, persistent, and accumulates in living organisms. Fluorescent lamps disposed of in landfills are a major source of mercury contamination in Washington State.

Effective January 2013, a new state law will require recycling of all fluorescent lamps and prohibit disposal in landfills.

Highlights of this focus sheet include:

- Ecology recommends that fluorescent lamps be managed intact as universal waste. Universal waste lamps cannot be deliberately crushed.
- Dangerous waste lamps can be crushed in a drum top crushing unit (DTC) as a regulated dangerous waste treatment activity.
- In general, crushing dangerous waste lamps received from off-site locations requires a permit¹.

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Special accommodations

If you need this document in a format for the visually impaired, call the Hazardous Waste and Toxics Reduction Program at 360-407-6700. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

Generator On-site Treatment Requirements

Large quantity generators (LQG) and medium quantity generators (MQG) can crush their own lamps without a dangerous waste treatment permit by following Ecology's [Treatment by Generator](#)⁴ (TBG) requirements at WAC 173-303-170(3).

TBG is not available to small quantity generators (SQG)ⁱⁱ who crush their fluorescent tubes. A SQG facility who crushes dangerous waste lamps can only do so as a regulated generator. In most cases they will follow requirements for medium quantity generators, including notifying Ecology and filing dangerous waste annual reports as a medium quantity generator.

Requirements That Apply to Facilities Using DTC Units

Consult the dangerous waste regulations or an Ecology hazardous waste specialist for all applicable requirements.

- Notify Ecology of the treatment activity on a [Site Identification Form](#)⁵ (Site ID form #ECY-070-133).
- Report all dangerous waste generation amounts on the [dangerous waste annual report](#)⁶, following the report instructions.
- Count lamp wastes toward generator status and for annual report purposes, including:
 - Dangerous waste lamps before treatment.
 - Dangerous waste crushed lamp debris after treatment.
 - Spent dangerous waste DTC filters.
- Remove dangerous waste crushed glass debris off site within 90 days for LQGs⁷ or 180 days for MQGs. The clock starts when a lamp first becomes a dangerous waste, or after it is removed from satellite accumulationⁱⁱⁱ.
- Store crushed lamps in sealed, non-leaking containers.
- Meet the performance criteria in [WAC 173-303- 283\(3\)](#)⁸. A key performance measure is to ensure that the treatment method does not endanger employee or public health.
- Demonstrate mercury is not released to the air by regular air monitoring during crushing operations and drum change out. *Mercury must not be released from the DTC unit or drum at any time.*
- Meet all applicable generator accumulation requirements. For example, development of emergency preparedness and contingency procedures and scheduled, documented facility inspections.
- Maintain a log of crushing activity and DTC maintenance procedures (performed according to manufacturer's recommendations).

Facilities must send crushed lamp glass that is dangerous waste to a permitted treatment, storage, or disposal facility (TSDF), or dangerous waste recycling facility^{iv}.

⁴ www.ecy.wa.gov/pubs/96412.pdf

⁵ www.ecy.wa.gov/pubs/ecy070133.pdf

⁶ www.ecy.wa.gov/programs/hwtr/waste-report/index.html

⁷ www.ecy.wa.gov/programs/hwtr/waste-report/gen_status_table.htm

⁸ apps.leg.wa.gov/WAC/default.aspx?cite=173-303-283

Mobile Drum Top Crushers Not Recommended

Ecology does not recommend using contractors with mobile lamp crushing equipment. Lamp generators cannot be sure a mobile system is compliant with the dangerous waste regulations and able to prevent mercury contamination. Both the lamp generator and the contractor are responsible for meeting the TBG requirements. In addition, the generator (property owner) must ensure that the contractor has a Dangerous Waste Transporter [EPA/State Identification number](#)⁹ if they will be taking dangerous waste crushed lamp glass off site. If they don't have the number, the crushed lamp glass must stay on site until a legal dangerous waste transporter can take it on a dangerous waste manifest.

Crushing Lamps from Off-Site Sources and Permitting

Some businesses, such as lighting contractors, may want to take lamps from off-site locations and crush them at their shop. Also, school districts or government entities may want to consolidate lamps from multiple facilities and crush them at a central shop facility. In general, a [Dangerous Waste Treatment and Storage Permit](#)¹⁰ is needed to crush dangerous waste lamps received from other generators, even if the lamps are coming from business customers or related facilities. This type of permit is usually only obtained by facilities whose main business is commercial management of dangerous waste.

Drum top lamp crushing equipment should not be used for large scale crushing of fluorescent lamps. Recycling facilities that process spent fluorescent lamps use specialized industrial equipment with highly efficient air pollution controls to protect workers and the environment from mercury exposures.

Ecology Does Not Recommend Using DTC Equipment

Although DTC equipment may seem to save costs over recycling, more regulation and potential latent costs may occur. For example, crushing lamps may cause a change in generator status along with more dangerous waste rules to follow. Additionally, crushing lamps means they cannot be managed under the less stringent universal waste rules. Costs related to mercury contamination of the workplace and worker health may also be a factor.

Properly designed and functioning DTC units crush mercury-containing fluorescent lamps under a sealed vacuum. Filters capture the mercury vapor and some of the mercury-containing phosphorus powder. Research has shown that mercury can leak from drum top crushers, risking employee health and environmental damage (see Bibliography). The referenced studies show that incorrect assembly and inadequate operation and maintenance contribute to mercury releases from DTC equipment. These mercury releases and corresponding worker exposures will vary depending on site and equipment conditions. Ecology does not recommend the use of drum top lamp crushers due to the difficulty in monitoring and controlling these releases.

⁹ www.ecy.wa.gov/programs/hwtr/waste-report/notification.html

¹⁰ www.ecy.wa.gov/programs/hwtr/permits/index.html

Bibliography

Treatment by Generator, Publication number 96-412, Washington State Department of Ecology, revised May 2011 www.ecy.wa.gov/biblio/96412.html

The Universal Waste Rule for Lamps WAC 173-303-573(5), Publication number 98-407C, Washington State Department of Ecology, Dec. 2005 www.ecy.wa.gov/biblio/98407c.html

Suzanne Davis, *Survey and Initial Evaluation of Small Fluorescent Lamp Crushers*, 2001 www.dtsc.ca.gov/TechnologyDevelopment/upload/OPPTD_Fluorescent-Lamp-Crushers.pdf

Environmental Protection Agency. *Fluorescent Lamp Recycling*, EPA530-R-09-001, February 2009 www.epa.gov/osw/hazard/wastetypes/universal/lamps/lamp-recycling2-09.pdf

Alan Lucas and Robert Emery, *Assessing Occupational Mercury Exposures During the Processing of Spent Fluorescent Lamps*, *Journal of Environmental Health* (2006): 30-34 www.cdc.gov/nceh/ehs/Docs/JEH/TOC/2006/March_2006_TOC.pdf

Minnesota Department of Health, *Health Consultation: Drum-Top Bulb Crusher Demonstration at the Minneapolis-St. Paul International Airport*, 2003 www.health.state.mn.us/divs/eh/hazardous/topics/drumtop.pdf

Endnotes

- i. Facilities that are allowed to treat waste received from off-site generators include: treatment, storage, and disposal facilities with a dangerous waste permit; dangerous waste recyclers (as described in endnote iv); and moderate risk waste facilities.
- ii. A small quantity generator (SQG) is a business that generates less than 220 pounds of dangerous waste or less than 2.2 pounds of certain highly toxic wastes per month and accumulates less than 2,200 pounds total at one time. SQGs choosing to perform treatment by generator on fluorescent lamps will be regulated under medium quantity generator requirements, at a minimum.
- iii. “Satellite accumulation area” is a location near the point of generation where dangerous waste is initially accumulated in containers, prior to being moved to a designated dangerous waste accumulation area.
- iv. A dangerous waste recycling facility is approved by a state hazardous waste program for recycling of hazardous wastes. Dangerous waste recycling facilities located in Washington State are subject to [Washington Administrative Code 173-303-120\(4\)\(c\) or \(d\)](#), whichever is applicable (<http://apps.leg.wa.gov/WAC/default.aspx?cite=173-303-120>).