Fluorescent Lamp Drum-Top Bulb Crushing Units

Drum top bulb crushing units are quickly becoming a popular option for the management of mercury-containing lamps and fluorescent tubes. These units typically consist of a sealed mechanical device on a 55-gallon drum top that breaks the lamp, collects the broken glass in the drum, and captures mercury-contaminated dust and/or vapor emissions in an internal filter. The crushed glass waste is sent for recycling or disposal (disposal is the most common option). When spent, the filters are typically sent off-site for reclamation or disposal as hazardous waste.

Management of spent lamps under the Universal Waste Rule (40 CFR 273) requires they be managed intact and cannot be treated. Crushing of spent lamps is considered treatment; therefore crushed tubes or lamps may not be managed as a universal waste.

The Land Disposal Restriction (LDR) requirements under 40 CFR 268 apply to hazardous waste at the point of generation. The point of generation is considered to be when and where the spent fluorescent lamps are removed from service. A hazardous waste determination as required by 40 CFR 262.11 should be made on the spent fluorescent lamps at the point of generation and before they are crushed.

Intentionally crushing lamps constitutes treatment and is allowed by generators only when conducted on-site by the generator of the hazardous waste or on-site by a contractor acting on behalf of the generator. The crushed glass is subject to all generator requirements 40 CFR 262 and LDRs (40 CFR 268).

A facility receiving and subsequently crushing lamps generated at another facility, regardless if both facilities are owned by the same entity, constitutes a destination facility (and must be a state approved recycling facility or a licensed Treatment, Storage or Disposal Facility [TSDF]) .

THINGS TO CONSIDER:

Before making the decision to purchase a drum-top bulb crushing unit, a generator must carefully evaluate the advantages and disadvantages of its use and determine the management option that best suits his/her needs.

Advantages:

- Requires less space than required to store intact bulbs
- Lamps are often broken during storage or shipment, despite the best efforts to store and transport them intact
- Convenient for shipping purposes

Disadvantages:

- Use of these units prevents the generator from managing the waste as universal waste
- May affect facility generator status and increase the regulatory burden
- May require worker training and the use of personal protective equipment
- May create worker exposure to mercury dust/vapor
- May inhibit proper recycling of mercury or glass material from the lamps
- Generators must track and keep records of machine throughput
- Additional regulatory burden from other local/state/federal government agencies

COMMON SCENARIOS:

To help understand the requirements, consider the following three common drum-top fluorescent bulb crushing unit scenarios:

Scenario #1: On-site use of drum-top bulb crusher by facility owner

The generator uses an on-site bulb-crushing unit to crush spent bulbs at the generator's own facility. Generators are allowed to treat their own waste under the hazardous waste regulations. The spent lamps are subject to a hazardous waste determination through testing (usually the Toxicity Characteristic Leaching Procedure [TCLP]) or through generator knowledge at the point of generation. The point of generation is when the lamp is removed from service. The waste determination must be made before the lamps enter the bulb crushing unit. Crushed tubes or lamps may not be managed as a universal waste.

The crushed glass remains subject to all hazardous waste generator requirements 40 CFR 262 and LDRs 40 CFR 268.

The spent filters may be sent off site for reclamation or disposal as hazardous waste. Loaded filters sent for disposal remain subject to all generator requirements at 40 CFR 262 and LDRs at 40 CFR 268. However, the carbon filter unit could be considered an Air Pollution Control (APC) device. 40 CFR 260 defines residues (loaded carbon in this example) from air pollution facilities as "sludge." Sludge that exhibit a characteristic of hazardous waste subsequently sent for reclamation are not defined as a solid waste and are therefore not a hazardous waste.

Scenario #2: On-site use of drum-top bulb crusher by a contractor

A contractor brings a bulb-crushing unit to a generator's facility to crush spent bulbs on-site. The contractor is acting on behalf of the generator. This treatment is allowed under the hazardous waste regulations. The spent lamps are subject to a hazardous waste determination through testing or through generator knowledge at the point of generation. The point of generation is when the lamp is removed from service. The waste determination must be made before the lamps enter the bulb crushing unit. Crushed tubes or lamps may not be managed as a universal waste.

The crushed glass remains subject to all hazardous waste generator requirements 40 CFR 262 and LDRs 40CFR 268.

The spent filters may be sent off site for reclamation or disposal as hazardous waste. Loaded filters sent for disposal remain subject to all generator requirements at 40 CFR 262 and LDRs at 40 CFR 268. However, the carbon filter unit could be considered an Air Pollution Control (APC) device. 40 CFR 260 defines residues (loaded carbon in this example) from air pollution facilities as "sludge," and "sludge" that exhibit a characteristic of hazardous waste subsequently sent for reclamation are not defined as a solid waste and therefore not a hazardous waste.

* All hazardous wastes generated must be counted toward the facility's generator status, not that of the contractor.

Scenario #3: Off-site use of drum-top bulb crusher by someone other than the generator

The bulb-crushing unit is used by an operator other than the generator of the spent lamps and the crushing/treatment is conducted off-site. Under this scenario, management of intact and unbroken lamps as universal waste is available to the generator. *Crushed tubes or lamps may not be managed as a universal waste.* The regulatory burden of the drum-top bulb crushing falls to the destination facility.

The off-site facility would constitute a destination facility (a state approved recycling facility or a licensed Treatment, Storage or Disposal Facility [TSDF]) and would require state authorization and/or a permit issued by the state.

* State authorization and/or a permit issued by the state would be required regardless of the destination facility's ownership – including situations where the destination facility is owned or operated by the generating facility.

References:

For more information on the Universal Waste Rules for Fluorescent and Other Mercury-Containing Lamps, see the following:

Business Environmental Program fact sheet on Universal Waste Lamps
http://unrbep.org/pdf/fact_sheets/universal_waste_lamps_final4_11.pdf

Mercury Lamp Drum-Top Crusher Study- U.S. EPA
http://www.epa.gov/waste/hazard/wastetypes/universal/drumtop/drum-top.pdf

Mercury-Containing Light Bulb (Lamp) Regulatory Framework- U.S. EPA
http://www.epa.gov/waste/hazard/wastetypes/universal/lamps/frame.htm

Universal Waste Handlers - Steps to Managing Your Universal Waste Lamps in an Environmentally-Safe Manner- U.S. EPA
http://www.epa.gov/wastes/hazard/wastetypes/universal/lamps/recycle.htm

Hazardous Waste Recycling & Universal Wastes
http://www.epa.gov/osw/inforesources/pubs/orientat/rom32.pdf