



Lamp Environmental Industries, Inc.
Protecting Your Company. Safeguarding Our Environment.

FIRST PCBs, NOW DEHP BALLASTS

Half of all non-PCB fluorescent light ballasts contain a toxic chemical called di (2-ethylhexyl) phthalate (DEHP). DEHP is listed as a hazardous substance under EPA's Superfund regulations. Educational and health care facilities discarding light ballasts should take the same precautions with their DEHP ballasts as they do with their PCB ballasts to avoid potential clean up liability. The best way to dispose of both types of ballasts is through combined incineration of the toxic materials and recycling of the metals contained within the ballasts.

What is DEHP and is it Harmful to Human Health?

DEHP is a clear, odorless, synthetic compound that is used extensively as a plasticizer. In studies conducted on rats and mice, DEHP caused adverse effects on the animal's liver, testicles, kidneys, thyroid, pancreas and fetuses. Long-term oral exposure of high levels of DEHP caused cancer in rats and mice. As a result, the EPA has classified DEHP as a probable human carcinogen. The U.S. Department of Health and Human Services suggests that it is reasonable to consider DEHP a carcinogen, and the International Agency for Research of Cancer classifies DEHP as a possible carcinogen.

How Much DEHP Did Ballast Manufacturers Use?

DEHP was used to replace PCBs as a dielectric fluid in ballast capacitors beginning in 1979. A capacitor is a metal capsule that contains about an ounce of nearly pure DEHP. By 1985, most manufacturers had stopped using DEHP in ballasts for four foot fixtures. However, they continued to use it until 1991 in most ballasts for eight foot fixtures and for HID fixtures. In most cases, the replacement for DEHP was a dry metallic capacitor. There are a maximum of 250 million DEHP light ballasts currently in use, containing in total, about 15 million pounds of DEHP. For comparison, it is estimated there are 40 million pounds of PCBs in installed lighting ballasts.

How Is DEHP Regulated?

DEHP is regulated by the U.S. EPA, OSHA, FDA, and 12 state and city agencies. Under the Superfund Laws, DEHP is a listed hazardous substance. This means that if DEHP is released into the environment, EPA could require the person responsible for the contamination to pay the entire cost of the site's clean up. EPA will try to distribute the cost of cleaning up the site to responsible parties, but if only one organization can be linked to the site, or if only one organization has the ability to pay that organization may have to bear the entire cost of the remediation. The cost of an average Superfund clean up is between \$30 and \$40 million. As a result, when dealing with ballast disposal it is prudent to implement special precautionary measures. The government does not have to prove negligence or mal-intent to charge an individual or organization with violating Superfund. Even EPA approved hazardous waste landfills can become Superfund sites.

DEHP ballast disposal is of particular concern with respect to Superfund because nearly half (587) of the 1,300 Superfund sites are contaminated with DEHP. However, the degree of contamination is not known. Many of these sites are municipal landfills. This means that there are many DEHP contaminated landfills that need cleanup sponsors and disposal of DEHP ballasts at one of these landfills could make the disposer a potentially responsible party to a clean up action.

The Agency for Toxic Substances and Disease Registry (ATSDR) ranks DEHP 63rd (top 10%) out of 700 hazardous substances that are the most common of Superfund sites and pose the most significant threat to human health and the environment. By comparison, ATSDR ranks PCBs in the top 1% of the same list.

To help prevent further improper disposal of DEHP, EPA has set a Reportable Quantity (RQ) of 100 pounds for the chemical under Superfund. This means that if someone is disposing more than 100 pounds of DEHP (an amount contained in roughly 1,600 light ballasts), they must report to the National Response Center and take responsibility for clean up.

Under RCRA (the Resource Conservation and Recovery Act), DEHP is listed as a hazardous waste when it is discarded in its pure form, but not after it is "used". For example, a drum of DEHP found at the loading dock of a DEHP manufacturing facility would be hazardous waste if disposed of, but a spent ballast capacitor filled with the chemical is not considered hazardous under RCRA because the DEHP has been used. The fact that DEHP is listed under RCRA is a good indication of its environmental significance.

At least 10 states and 2 cities go beyond the federal government in regulating levels of DEHP in air and water. The seven states that regulate DEHP in air have established ambient air concentrations of DEHP. The six states that regulate the levels of DEHP in water have set maximum acceptable levels in drinking water.

Disposal Options

There are essentially four options for the disposal of DEHP ballasts.

1) Sanitary Landfill Or Municipal Incinerator

Disposing of DEHP ballasts in a municipal landfill is not recommended because the DEHP in ballasts is a liquid contained in a metal capsule that can rupture or rust. Once the DEHP is released it can flow into the landfill's leachate and contaminate soil and groundwater because sanitary landfills are not designed to contain hazardous substances.

Municipal or waste to energy incinerators are also not designed for hazardous waste. It is very difficult to incinerate a whole ballast because it is a solid metal mass. Since the DEHP may not burn completely, it can remain in the ash and eventually contaminate the soil or groundwater, as in the sanitary landfill option.

It is also not recommended disposing of DEHP ballasts in the dumpster, even though it is among the lowest cost (short term) and convenient options. This option yields an extremely high potential environmental cost and could result in Superfund clean up liability for anyone involved.

2) Hazardous Waste Landfill

This option certainly protects the environment to a greater degree than using a non-hazardous waste landfill. However, it still leaves the generator of the waste with potential legal liability. Hazardous waste landfills are not immune from having to be cleaned up as Superfund sites. In the event the landfill does require clean up, EPA has access to a complete record of however sent waste to the landfill and can easily assign financial responsibility to all the parties involved.

This option may be tolerated by those persons or organizations who are willing to take environmental risks in return for short-term cost advantages. It is not recommended for organizations who have long-term perspectives and who are conservative when it comes to environmental risk taking.

3) Whole DEHP Ballast Incineration

This option entails sending whole ballasts to a hazardous waste or PCB incinerator for total destruction. This is the most expensive option but it is among the most secure since all of the DEHP is destroyed.

Even though this option is environmentally acceptable (though not optimal), it is not as popular as the recycling/incineration option because the latter is lower cost, offers the same level of environmental protection and recycles valuable metals as described below.

4) Ballast Recycling And DEHP Incineration

This method entails sending the ballast to a ballast recycling facility where the ballasts are disassembled, and the small capacitors containing the DEHP and the asphalt potting material are segregated for disposal. The remaining metals, including copper, steel, and aluminum are reclaimed. In this process, over 80 percent of the ballast by weight is recycled.

Once separated from the ballast, there are two options for the disposal of the DEHP capacitor and potting material. They can either be incinerated, ensuring complete destruction of the DEHP, or disposed of in a secure hazardous waste landfill. The recycling/incineration option is the best overall disposal method given the relative cost, environmental protection and avoidance of future liability that is guaranteed by total destruction of the DEHP.

This article was written by Mitchell Dong and Brian Copper