

Polychlorinated Biphenyls (PCBs) in Fluorescent Light Ballasts

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Introduction

This information bulletin discusses:
the potential for exposure to PCBs from fluorescent light ballasts,
the health effects of exposure to PCBs, and
recommendations for safe work practices.

What are PCBs?

Polychlorinated biphenyls (PCBs) are a class of chemicals that have good electrical insulating properties. PCBs are a mixture of chemicals that are clear to yellow oily liquids or solids. PCBs from a capacitor which has exploded may be black.

PCBs in Fluorescent Light Ballasts

Most fluorescent light ballasts manufactured before 1979 contain about a teaspoon of concentrated PCBs sealed inside the capacitor. The capacitor is usually surrounded by a tar like potting material and is enclosed in the ballast box. Normal ballast operation does not emit measurable amounts of PCBs, but when an old ballast fails, the capacitor may rupture and leak PCBs. Since you may not always be able to tell the difference between the tar and PCBs, assume the leakage contains PCBs. The U.S. Environmental Protection Agency banned the further manufacture of equipment containing PCBs in 1979. BALLASTS MANUFACTURED AFTER 1979 DO NOT CONTAIN PCBs AND ARE LABELED 'NON-PCBs.'

In one study, failure of ballasts manufactured before 1979 resulted in PCB surface and air contamination levels above normal background levels.(1) The results of this study showed that the air levels decreased significantly within the first week, remained elevated for a few months, and returned to approximately background levels in about 5 months under "normal ventilation conditions." The dispersion of PCB-bearing particulate and/or condensation of volatilized PCB vapors will also result in contamination of surfaces in the workplace above normal background levels.

Clean-Up

When a PCB-containing ballast fails, proper procedures should be followed to minimize the potential exposure to PCBs via inhalation, skin absorption or ingestion. Proper procedures following burnout of a ballast would include

- a. turn off the light fixture and remove persons from the room as soon as possible;
- b. open the windows in the room and take any measures possible to vent room air directly to the outdoors and replace it with fresh air;
- c. remove the failed ballast; and
- d. wipe down general contact surfaces (such as desks, chairs, tables, etc.)

Persons doing the cleanup or ballast removal should wear protective gloves to prevent skin contact with the PCBs (PCBs are readily absorbed through the skin and some glove materials). Gloves made of fluoroelastomers are generally recommended for this type of exposure. Safety equipment suppliers can also provide recommendations on the proper glove for this situation.

If the incident occurs in a room which cannot be vented, the person replacing the failed ballast can reduce his/her potential inhalation exposure by wearing a one-half facepiece respirator equipped with a prefilter and an organic vapor cartridge.

If PCBs get on your skin, remove any contaminated clothing and wash contaminated skin thoroughly with soap and water. You do not need to see a doctor for this type of exposure.

Clothes contaminated with PCB liquid from a ballast should be washed separately from other clothes. Avoid further contamination.

To remove the bulk of the contamination use a spatula or paper towel. A hard, relatively nonabsorbent surface contaminated with residue that has leaked from the ballast, should be cleaned with an organic solvent such as deodorized kerosene or mineral spirits. It is important to note that the residue may be concentrated with significant levels of PCBs. Thus, precautions should be taken to avoid skin contact (PCBs can be absorbed through the skin).

General surface cleaning should be done using a solution of a octylphenoxypolyethoxyethanol nonionic surfactant detergent in water followed by a water rinse. An application strength of approximately 5% (volume to volume) should be adequate to remove the surface contamination. The addition of a mild caustic such as trisodium phosphate to the wash solution will help emulsify any thin grease deposits that are on the surfaces prior to the ballast burnout and will also help remove waxes and some

furniture polishes that will otherwise absorb PCBs from the air. It is advisable to test any cleaning solution on a surface hidden from view to ensure that discoloration of furniture does not occur.

Absorbent types of material (e.g. carpets) visibly contaminated with residue that has leaked from the ballast cannot be cleaned easily. In the case of carpeting, the carpet should be removed in a six-inch radius around the contamination point.

The concentration of PCBs in room air will decrease rapidly if the windows can be opened, the room ventilated, and the ballast removed quickly.

Dispose of leaky ballasts, contaminated gloves, and clean-up material in a manner that prevents leakage. For example, a leaky ballast and other contaminated material should be wrapped securely in layers of newspaper, placed in a heavy plastic bag, which should then be sealed. Those who collect large numbers of ballasts may need to dispose of them as a hazardous waste. The New Jersey Department of Environmental Protection, Waste Classification Unit (609-292-8341) should be consulted for proper disposal of PCB containing wastes.

Health Effects of Exposure to PCBs

A significant human health risk is not likely to be associated with being in a room for a short period of time after electrical burnout of PCB containing fluorescent light ballasts.

A worker exposed to even a large quantity of PCBs may not experience any immediate ill health, although exposure may result in skin irritation and persistent skin rashes. A painful and persistent condition known as chloracne may result. Other concerns about the potential health effects of exposure to PCBs are:

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to Polychlorinated Biphenyls:

- Exposure to the vapor can irritate the eyes, nose and throat.
- High exposures can damage the liver.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Polychlorinated Biphenyls and can last for months or years.

Cancer Hazard

Polychlorinated Biphenyls are PROBABLE CANCER-CAUSING AGENTS in humans. There is some limited evidence that they cause skin cancer in humans and they

have been shown to cause liver cancer in animals. Many scientists believe there is no safe level of exposure to a cancer-causing agent. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard

Polychlorinated Biphenyls may be TERATOGENS in humans since they have been shown to be teratogens in animals. They may be passed to a child through mother's milk. Polychlorinated Biphenyls can affect the reproductive system of adults.

Other Long-Term Effects

- Repeated exposures can cause liver damage.
- Polychlorinated Biphenyls can cause a severe acne-like rash (chloracne). This may persist for years.
- High exposures can damage the nervous system, causing numbness, weakness, and tingling (pins and needles) in the arms and legs.

HANDLERS OF FLUORESCENT LIGHT BALLASTS THAT HAVE FAILED ARE AT LOW RISK DUE TO THEIR INFREQUENT EXPOSURE TO SMALL AMOUNTS OF PCBs. HOWEVER, EVEN THIS EXPOSURE IS AN UNNECESSARY RISK BECAUSE EXPOSURE IS EASILY AVOIDED IF THE RECOMMENDATIONS OF THIS BULLETIN ARE FOLLOWED.

If you have further questions, please contact the Public Employees Occupational Safety and Health Program at (609) 984-1863 or write to the New Jersey State Department of Health and Senior Services, PEOSH Program, PO Box 360, Trenton, New Jersey 08625-0360.

You can obtain a New Jersey Right To Know Fact Sheet on PCBs from the New Jersey State Department of Health and Senior Services, Right to Know Program, PO Box 368, Trenton, New Jersey 08625-0360.

(1) Komisky, J.R. and Paulozzi, L.: Polychlorinated Biphenyl Contamination Resulting from Fluorescent Light Ballast Burnout. Presented at the American Industrial Hygiene Conference, Dallas, Texas, May 18-23, 1986.

<http://www.state.nj.us/health/eoh/peoshweb/pcbib.htm>