

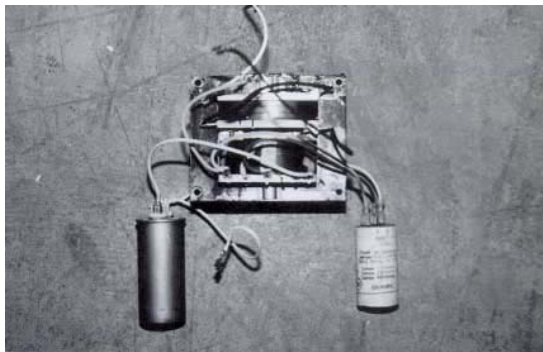
PCB DISPOSAL

PCB BALLASTS

Ballasts come in all shapes, sizes and weights. The most common ballasts encountered for disposal as PCB wastes are found associated with fluorescent lights. Their function is to maintain a constant current through the electrical system and they are normally mounted on the light fixture between the fluorescent tubes and are protected by a metal cover plate.



The typical ballast contains a reactor core/coil assembly, a thermal protector (switch) and a capacitor, held in place by an asphalt-silica mixture (ASM), which performs a dual role function of heat transfer and moisture barrier.



Although the capacitor is the component that contains PCBs, the ASM has been found to be PCB-contaminated in some cases to several thousand ppm (mg/kg) either from the manufacturing process or from a leaking capacitor.



The capacitor contains approximately 17 ml (1.3 oz) of liquid PCBs with approximately half of this fluid absorbed by several layers of paper inside the capacitor. The risk of PCB leakage is quite low due to the construction of the capacitor.

During the past several years, many organizations have conducted ballast retrofit projects involving identification, removal and disposal of PCB ballasts.



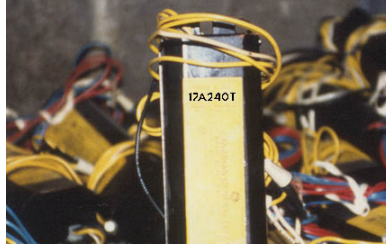
Due to the fact that there were so many companies that manufactured ballasts, it is a challenge to properly identify PCB versus non-PCB ballasts. The following chart provides some information regarding a few of the most common ballast manufacturers and how PCB ballasts can be identified for replacement. Ballasts not included on the list should be considered to contain PCBs if they were manufactured prior to July 1, 1980. For comparison, see Table 2 at the end of this section.

Table 1. Ballast Identification

Manufacturer	Date Code	Catalogue Code
Aerovox - Canada	AE 7806 or lower code no.	Fifth unit is 'F'
Aerovox - USA	AH 7806 or lower code no.	Fifth unit is 'F'
Allason		
Fluorescent lamps		Lower than 'LL'
HID lamps containing capacitors	Type number lacks "N"	
CGE	7706 and lower	Ends in T or TW
GE (U.S.A.)		Ends in other than E or W
Philips		
Fluorescent lamp		
Ballasts 1278 or lower	Not marked "NON-PCB"	
HID ballasts		Marked "PCB"
Sola Canada		Contains 'ACA'
Sola - USA	Lower than: 79L311EG	
Universal	Lower than L78	Marked "No-PCB"
Westinghouse	Same as CGE	Same as CGE

Where applicable, only the portions of the codes indicated in the schedule in bold-face are important in determining if the product contains PCBs. Identification may require disassembly of fluorescent lamp ballasts or other lighting systems such as High Intensity Discharge (HID) systems which contain capacitors that are open to view. Aerovox codes are located on labels attached to capacitors.

The following GE ballast is identifiable as a PCB ballast based on the T at the end of the serial number code on the label.



Sometimes ballast labels are difficult or impossible to read or have been removed altogether. It should be assumed that they are PCB type if they appear to be of the same vintage as the other ballasts in the lights or based on the age of the building, that is, older than 1980.



Removal of ballasts can be accomplished using a small stepladder when the ceilings are low enough. However, in some cases light fixtures can be several feet off the ground and will require some kind of lifting device to reach them.



It is important for all employees required to handle PCB containing ballasts to be completely aware of the procedures for the removal and storage including associated safety precautions and the use of safety equipment.

However, in our experience, many contractors do not employ safe ballast handling practices. For example the piling of light fixtures up to 10 feet or more can be problematic when fixtures shift, slide or roll off.



An area designated for storing ballasts removed from fixtures should be identified prior to a job and all workers should be required to follow proper handling procedures. The following is a summary of the procedures that have been developed and implemented by several groups for the removal and storage of fluorescent light ballasts containing PCB's.

- 1. All ballasts to be removed must be disconnected from the main power source prior to commencing removal. Electrical lock-out procedures will apply.**
- 2. Light fixtures and ballasts are to be visually inspected for leaks prior to disconnect/removal from the light fixture.**
- 3. Employees removing ballasts from the fixtures are to wear disposable protective gloves and protective eye equipment to avoid contact with any leaking asphalt-silica mixture. When ballasts are leaking the asphalt-silica mixture, the employee will wear nitrile gloves in addition to the disposable gloves.**
- 4. When removing ballasts the immediate area is to be clear of any other persons.**
- 5. Removed ballasts are to be placed in plastic bags and sealed. The sealed bags will then be placed into an 18-gauge open-top drum packed with vermiculite or other suitable sorbent.**
- 6. Any leakage of the asphalt-silica mixture from the ballast is to be cleaned using a hydrocarbon solvent, the cleaning clothes are to be packaged in plastic bags, and placed into the storage container with the ballasts. During this cleaning process the employee will wear both disposable gloves and nitrile gloves to protect their hands. Disposable coveralls will also be provided for this clean up procedure.**
- 7. In the event of skin contact with either the asphalt-silica mixture or PCBs, thoroughly wash the contacted area with soap and water.**

8. Should any asphalt-silica mixture come in contact with the employee's clothing, the clothing is to be removed and washed as soon as possible.
9. Employees will be expected to follow proper hygiene practices when handling ballasts.

At demolition sites, it is a common practice to place ballasts on pallets for later loading into drums for removal from site.



When working indoors, many contractors will place ballasts in the same boxes the non-PCB ballasts came in. This practice just adds to the work when ballasts are later removed, otherwise the boxes add unnecessary weight that will be reflected in higher disposal costs.



When retrofit projects involve replacement of entire light fixtures, the PCB ballasts may be piled up while still in the fixtures, prior to their removal, containment and transportation off site for disposal.



Prior to sorting, sometimes ballasts are stored on shelving units. This is OK if the ballasts are not leaking, if there are not too many of them and if the sorting is done expeditiously.



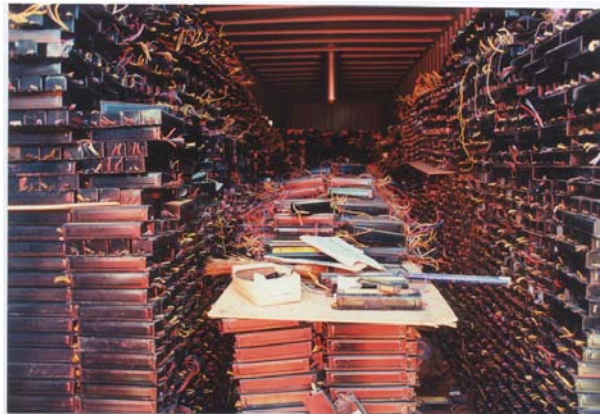
For maximum efficiency, PCB ballasts should be placed in proper 18-gauge open-top drums with ring and bolt.



Alternatively, if ballasts are not leaking, they can be placed in metal crates that can be stacked and easily handled by fork trucks.



If ballasts are not stored properly, they can represent a potential safety risk, especially if they are stacked too high. In one instance, 30,000 ballasts were stacked to the ceiling in a 40-ft container.



If 1,400 nine-inch fluorescent ballasts weigh approximately one metric tonne (2,200 kg), a collapse of part of a wall could literally crush someone to death. PCB Disposal was able to safely un-stack the ballasts, load them into drums and remove them from site for disposal.

Miscellaneous Ballasts

The following photos will serve to demonstrate several other types of PCB ballasts that are found in commercial and industrial facilities.



Table 2. Identification of Ballasts

Company	PCB Identifier Code
Aerovox Incorporated Canada	<p>Two possibilities:</p> <ol style="list-style-type: none"> Four number code on capacitor label. The first two numbers are the year and the last two are the month (e.g., January 1980 = 8001). PCBs are present up to and including June 1978 (7806). Six digit letter and number code stamped on capacitor. PCBs are present if the fifth digit is "F".
Advance Ballasts (supplied by Phillips)	Three or four digit number code on the ballast cover. The first one or two numbers indicate the month and the last two numbers are the year. PCBs are present up to and including 1978.
Allanson Division of Jannock Ltd.	Two letter code on ballast plate. The first letter is the month, starting with "A" for January and the second letter is the year, starting with "A" for 1969 (e.g., February 1972 = BD). PCBs are present up to and including December 1980 (LL).
Canadian General Electric	<p>Two possibilities:</p> <ol style="list-style-type: none"> Seven letter and number digit code on ballast name plate. PCBs are absent if one of the two final letters is "E" and <i>likely present</i> if it is "T". Four number code on ballast housing. The first two numbers, when reversed, are the year (e.g., 1976 = 67) and the last two numbers are the month. PCBs are present up to and including March 1978 (8703).
Westinghouse Canada	Same as for Canadian General Electric (above).
Magnatex Polygon	Letter and number code on the ballast. The last four numbers represent the year and the month. PCBs may be present up to and including June 1980 (June 1980 = 8006). PCBs are present in capacitors made in 1978-79 unless there is a green "NO PCB" sticker on the ballast label.
Magnatex Universal Manufacturing (USA)	Three digit letter and number code on ballast cover. The first letter is the month (A = January) and the last two numbers are the year. PCBs are present up to and including December 1978 (L78). PCBs are absent if "N" follows the code.
Phillips Electronics	Coding system changed in 1980. Units made after early 1979 are marked as being free of PCBs.

	Treat units not marked "PCB free" and those that have digit code ending with 79 or earlier as containing PCBs.
Sola Canada	Three digit letter and number code on ballast label. The first letter is the month (A = January) and the last two numbers are the year. PCBs are present up to and including December 1979 (L79).
Sola Electric (USA)	Eight digit letter and number code on ballast name plate. The first two numbers are the year. Assume PCBs are present up to and including December 1979.
Other Manufacturers	Assume PCBs are present if the unit is not marked "PCB Free" or not clearly dated 1980 or later.
High Intensity Discharge Lamps	<i>Allanson Division of Jannock Ltd.</i> Puts "N" before the code if PCBs are absent. Others are usually marked "PCB" or "No PCB". Assume PCBs are present if the label is not marked otherwise. <i>Holophane Canada Inc.</i> puts "BAA" before its three digit code number on capacitors with PCBs. <i>Sola Canada</i> marks PCB capacitors with a code beginning "ACA".

Based on what PCB Disposal has seen at hundreds of sites over the years, not all contractors are able to separate PCB from non-PCB ballasts. In some cases, drums that had been identified as containing PCB ballasts actually contained 33% non-PCB ballasts.



When substantial numbers of non-PCB ballasts are removed for disposal as PCB waste, this can add several hundreds and even thousands of extra dollars to the disposal cost. It is therefore important to ensure that all contractors are well experience in ballast identification.



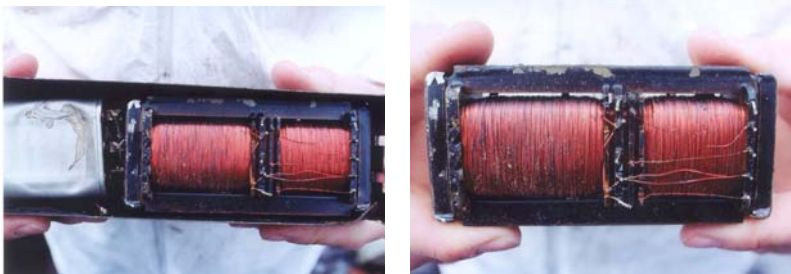
As an option, ballasts can be stored on pallets and left for sorting by the PCB disposal company.



Although it was a common practice to break down ballasts into their component parts on site, this activity is now accomplished at the various transfer stations. The copper coils and capacitor inside ballasts is insulated with asphalt-silica mixture (ASM).



When the ASM is removed, the capacitor and copper coils are revealed.



The value in the ballast is obviously the copper coils which are recovered and sent away for recycling.



NOTE

Under the new federal PCB Regulations passed on September 5, 2008 and published in the Canada Gazette September 17, 2008, ballasts are exempt from the deadlines that are imposed on in-service askarel transformers and PCB capacitors that must be removed and disposed of by December 31, 2009. All PCB ballasts are to be removed from service by Dec 31, 2025.

For more information see "New PCB Regulations".