

# Elements of Surprise: Don't Get Caught Off Guard by E-Waste Contaminants

## Introduction

When you replace your electronic devices have you ever wondered what happens to unused or discarded items? Essentially, they exist as electronic waste (e-waste). By definition, e-waste is electronic products used for data processing, telecommunications, or entertainment in households and businesses that are outdated, broken, or cannot be fixed. Materials used in these products are often toxic because they are made with harmful chemicals such as mercury, lead, cadmium, brominated flame retardants, and hexavalent chromium. If misused or mishandled, these chemicals can create serious health hazards. Learning about these hazardous substances and how they contaminate our environment and food and water supplies will help prepare you to recycle or to properly dispose of these products.



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## E-waste Contaminants

Here are a few of the most common e-waste contaminants.

### **Mercury**

Mercury is a natural metallic element found in rocks and the earth's crust that can be harmful and toxic if improperly handled. A unique element, it is a liquid at normal temperatures and forms an odorless gas when heated. Airborne mercury, in its gaseous state, eventually settles on land or into water where microorganisms convert it to methyl mercury. Methyl mercury is toxic and builds up in fish and in animals that eat fish.

While mercury exists as an element or combines with other elements to form organic and inorganic compounds, exposure to inorganic mercury compounds is limited due to current product bans. Health problems that occur as a result of mercury exposure depend on the length and frequency of exposure and individual body responses. Mercury is particularly harmful to fetuses and young children. Young and nursing mothers should be particularly cautious. Adverse effects include nausea, coughing, abdominal and chest pains, vomiting, and diarrhea. Continued exposure through inhalation or skin permeation can result in disturbances to the nervous system, tremors, impaired thinking or reasoning, sleep disturbances, irritability, depression, and even kidney damage.

Although measures have been taken in recent years to control mercury use in the United States, further precautions are necessary to ensure compliance with current regulations,

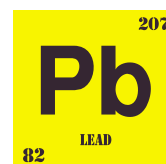


to prevent improper disposal of mercury, and to protect against mercury spills and against products, such as some pesticides, that still contain mercury.

The United States Environmental Protection Agency (EPA) regulates the use and disposal of mercury in this country. Citizens can help eliminate this harmful substance by not buying and properly disposing of products that contain mercury.

Common uses for mercury and potential contaminants include fuel indicators, non-digital thermostats, barometers, thermometers, sensors in video cameras, laptop shutoffs, fluorescent lamps, some cosmetics and antiseptic creams, dental fillings, lawn chemicals, automobile high-intensity discharge headlights and hood lights, appliances and motor switches, iron and washer shutoff switches, batteries (largely phased out in 1996 with the Rechargeable Battery Management Act), paper manufacturing, and old exterior paints.

In case of a spill, never dispose of mercury as regular domestic waste or place it down the drain. You risk ground water contamination. Seek information from health and safety advisors such as the EPA, the Alabama Department of Public Health, or the Alabama Department of Environmental Management at (334) 271-7730.



### **Lead**

Lead is a naturally occurring metal in ore deposits and a common water contaminant. An abundant toxic by-product of e-waste, lead is found in glass panels on computer monitors and cell phone displays and it is used in electronic solders and as a sheathing material for power cables. Toxic levels exceeding standards set by the EPA can be hazardous to human health. Unsafe levels of exposure can be acquired through lead based paints, gasoline, contaminated drinking water, metal plumbing, soldering, lead mining, and smelting operations.

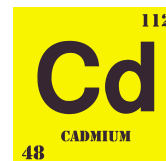
The misuse of lead has been associated with global health issues. In 1974, the Safe Drinking Water Act was established to define requirements for safe levels of lead and other chemicals in drinking water that must be adhered to by all public water suppliers.

High-level exposure or cumulative effects of lead exposure have tremendous adverse effects. Lead is the leading cause of environmental health threats to children. The effects of short-term exposure to lead at levels above standards include interference with the chemistry of red blood cells, learning and attention deficits in children, physical and mental health impairment in children, and increased blood pressure in adults. Long-term exposure to lead at unsafe levels can cause a stroke, kidney disease, and cancer.

Household lead waste should be disposed of according to local solid waste regulations. Contact your local solid waste utility or local government for more information.

### **Cadmium**

Cadmium is a chemical element known to cause cancer. The soft metal has a bluish white appearance and emits a brownish, nonirritating fume when burned. It is a by-product of zinc, copper, and lead ores. The element and solutions of its compounds are toxic even in low concentrations. Continuous exposure at low levels can build to increased toxic levels over time.



Cadmium is released into the environment in large amounts. About half of the source is from the weathering of rocks; the remaining percentages come from human activities

such as production processes. Cadmium compounds are used in batteries, artificial phosphate fertilizers, plastic stabilizers, plating for metal parts, manufacturing paints and pigments, black and white television phosphors, and in blue and green phosphors for color television tubes.

Cadmium pollutions in soil and water are extremely dangerous due to the increased potential for absorption by plants and aquatic life. People can be exposed to cadmium when they eat contaminated plants or drink contaminated water. Human intake can occur through eating certain foods, by breathing in cadmium from hazardous waste sites or factories, and by smoking cigarettes.

Breathing in cadmium can severely damage the lungs and the kidneys. Other adverse health effects include cancer, stomach disorders, bone fractures, damage or interference with the nervous, immune and reproductive health systems, and changes in human deoxyribonucleic acid, better known as DNA.

For information on how to properly dispose of cadmium contact your local public health department, the Poison Help hotline at (800) 222-1222, or the Agency for Toxic Substances and Disease Registry at (888) 422-7837 or ATSDR@cdc.gov.



### **Bromine**

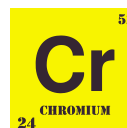
Bromine is a nonmetallic element that exists as a brownish red liquid at room temperature. It exists naturally in the earth's crust and in seawater. The element has a strong bleaching effect and should be handled with caution to avoid serious health hazards. Bromine is an irritant to eyes, throat, skin, mucus membranes, and the respiratory system. Direct contact with the skin causes sores and exposure to concentrated bromine vapors can be fatal.

Bromine is used in making medicines, sanitizers, and dyes. It is also used in pool maintenance, in gauges, in photographic film, and as a water purification compound. Its use in brominated flame retardants and flameproofing agents is increasing.

For more information about bromine contact your local poison center or the Centers for Disease Control and Prevention's public information line at (800) CDC-INFO/ 232-4636. In Alabama, contact the Alabama Poison Center at 1-800-462-0800.

### **Chromium**

Chromium is a chemical element, steel gray in color with a high polish and high melting point. Hexavalent chromium compounds are chemical substances that contain the element chromium. The compounds may be found in dyes, paints, primers, inks, spray paints and coatings, cements, plastics, and welding metals.

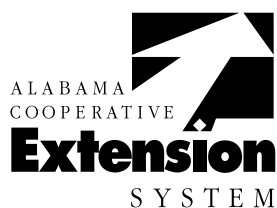


Hexavalent chromium is the substance that Erin Brockovich, the famous environmental consumer advocate, campaigned against in California. Breathing high levels of or coming into direct contact with this chemical can irritate the nose, throat, lungs, skin, and eyes. Industry workers that breathe the compounds over many years can be at risk of developing lung cancer.

For more information contact the Occupational Safety and Health Administration at (800)-321-OSHA/6742.

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