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*Persistent, Bioaccumulative and Toxic Chemicals*

## Lead and Lead Compounds

### What are PBT chemicals?

Persistent, bioaccumulative and toxic (PBT) chemicals do not readily break down in the environment, are not easily metabolized, may accumulate in human or ecological food-chains through consumption or uptake and may be hazardous to human health or the environment. A PBT chemical, once released to the environment, may present increasing long-term toxic effects to human health and the environment, even if the release was of a small amount. The U.S. Environmental Protection Agency (U.S. EPA) has created a priority in its hazardous waste minimization program to reduce the presence of PBT chemicals, promote pollution prevention and avoid the transfer of PBT chemicals across environmental media.

Lead is a high priority PBT chemical.

### What is the adverse effect of lead?

Lead poisoning affects virtually every system in the body, especially the nervous system. Often it occurs with no distinctive symptoms at low levels. Lead tends to bioaccumulate in bone after long-term exposure.

Lead can damage a child's central nervous system, kidneys and reproductive system. At very high levels, lead can cause coma, convulsions and death. Even low levels of lead are harmful and are associated with decreased intelligence, impaired neurobehavioral development, decreased stature and growth and problems with coordination.

**Lead** is naturally present in soil in many geographic regions. It is used in many industrial settings. Lead is a bluish-white lustrous metal at room temperature. It is very soft, highly malleable, ductile and a relatively poor conductor of electricity. Lead does not degrade and is not destroyed by combustion. It cycles between the soil, the atmosphere and surface waters. Even low levels of lead are harmful. Lead poisoning can cause learning disabilities and behavioral problems which can be irreversible. In extreme cases, higher levels of lead can cause seizures, coma and death. Lead use and pollution should be prevented wherever possible.

In 1999, Ohio's Resource Conservation and Recovery Act (RCRA) regulated facilities reported generating 93 million pounds of lead and lead compounds in waste.

### Where is lead found?

Before its harmful effects were known, lead was widely used in paint, gasoline, water pipes and many other commonly used products. Today, lead-based paint, leaded gasoline and lead-based household plumbing are mentioned mostly in past tense. However, remnants of the old hazards remain.

Lead is still used in a wide variety of industries. The largest usage is in storage battery manufacturing. Some of the other uses include: solders, ammunition, electroplating, electrical equipment, X-ray and nuclear shielding, specialty casting, cement glazes and stabilizer in plastics. It is also used in lining pipe and sheet in chemical installations.

Lead is released as a waste by-product of combustion and incineration. Lead contamination has been found in urban storm water runoff, landfill leachate and aquatic sediments. Lead is naturally present in soil in many geographic regions. The

U.S. EPA in 1998 identified lead-based paint, point source emitters and leaded gasoline as three sources of elevated soil-lead levels and suggested targeting these sources in reducing lead contamination of soil.

Some of the most likely source of exposure to lead include:

- Lead-based paint - For homes built before 1978, this is one of the most common sources that children may encounter. Some paths may include old paint chips from disrepair, surface areas that children can access such as windowsills, or paint being disturbed during remodeling. Some lead compounds can taste "sweet." Young children tend to "mouth" on lead painted surfaces.
- Dust and soil - Lead contamination may come from old paint, past emissions of leaded gasoline and pollution from nearby operating or past industrial sites and smelters.
- Drinking water - Lead-containing water pipes were used in many homes built before 1930. Even newer copper

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pipes may have lead solder. Some brass faucets and fittings may also leach lead.

- Jobs and hobbies - Activities such as making pottery or stained glass, refinishing furniture, doing home repairs and using indoor firing ranges can expose participants to lead. Lead residue from clothing may also expose children.

- Food - Imported food cans often have lead solder. Lead is found in certain crystal glassware and some imported or old ceramic-wares. Lead is also found in some ethnic foods due to the manufacturing process.

- Folk medicines - Certain folk medicines and traditional cosmetics contain large amounts of lead.

### Who is at risk?

Industrial lead poisoning used to be very common. Experiences have taught people to take protective actions. However, environmental lead exposure is still a pressing concern.

Children between 12 and 36 months of age have a lot of hand-to-mouth activity. If there is lead in their homes or surroundings, they are more likely to take it in than are older children.

According to Center for Disease Control and Prevention estimates, 890,000 U.S. children aged 1-5 have elevated blood lead levels. More than one-fifth of African-American children living in housing built before 1946 have elevated blood levels. These figures reflect the major sources of lead exposure for residents: deteriorated paint in older housing, dust and soil that are contaminated with lead from old paint and past emissions of leaded gasoline or other environmental pollution such as a nearby battery manufacturer or smelter.

Measuring blood lead concentration is the standard test for exposure to lead in industrial monitoring and for screening children. For children at risk for lead exposure, a simple blood test can prevent the irreversible damage of lead poisoning.

For more information, talk to your pediatrician or call the National Lead Information Clearinghouse toll-free at 1-800-424-LEAD (1-800-424-5323).

Ohio EPA's Division of Surface Water offers a fish consumption advisory because some toxic chemicals such as polychlorinated biphenyls (PCBs), mercury and lead have been found in some fish and turtles in certain waters. For current updates of the fish advisory, check [www.epa.state.oh.us/dsw/fishadvisory/index.html](http://www.epa.state.oh.us/dsw/fishadvisory/index.html).

### How can people reduce risk of lead poisoning?

The first step in treating lead poisoning is to avoid further contact with lead. For adults, this usually means making changes at work or in hobbies. For children, it means finding and removing sources of lead in the home. The following steps can help prevent lead poisoning:

- Keep the areas where children play as clean and dust free as possible.
- Make sure children wash their hands before meals and at bedtime.
- Have household tap water tested to find out if it contains lead.
- Use only cold water for drinking, cooking and making baby formula. Hot water is more likely to contain higher levels of lead. Run the cold-water tap for about 30 seconds before

using it for drinking or cooking, if cold water hasn't been used for six hours or more.

- Do not store food in open cans, especially imported cans.
- Do not store or serve food in pottery meant for decorative use.
- Try purchasing and using only non-lead fishing sinkers and ammunition to prevent lead getting into the environment.
- Be alert for any public notices or recalls about products that may contain lead.

### Sources

Agency for Toxic Substances and Disease Registry  
[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)

TOXNET, National Library of Medicine, National Institutes of Health  
[www.toxnet.nlm.nih.gov](http://www.toxnet.nlm.nih.gov)

The Office of Pollution Prevention was created to encourage multimedia pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, as a second choice, environmentally-sound recycling while avoiding cross media transfers. The office develops information related to pollution prevention, increases awareness of pollution prevention opportunities, and can offer technical assistance to business, government and the public.

For more information, visit the Office of Pollution Prevention's Web site at [www.epa.state.oh.us/opp](http://www.epa.state.oh.us/opp)

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