Lead

General information

Key Points

Fire

- Reacts with hot concentrated acids
- May cause explosions on contact with hydrogen peroxide or sodium, potassium or magnesium and their salts
- In the event of a fire involving lead, use fine water spray and normal fire kit with breathing apparatus

Health

- Toxicity most frequently results from ingestion or inhalation and rarely from dermal or ocular exposure
- Harmful
- Short-term exposure causes metallic taste, abdominal pain, sickness, loss of appetite, low blood pressure, kidney and liver damage
- Long-term exposure causes anaemia, headaches, irritability, tiredness, muscle weakness, paralysis, kidney and liver damage and stomach upsets
- In children, chronic exposure may lead to cognitive deficit, such as a decrease in IQ Such effects do not exhibit a threshold
- Lead exposure may cause miscarriages or still births or fertility problems in males
- Lead compounds are probably carcinogenic to humans

Environment

- Dangerous for the environment
- Inform Environment Agency of substantial release incidents

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Background

Lead is a naturally occurring element in the earth's crust. Much of the lead emitted into the atmosphere is in the form of inorganic salts. Exposure to inorganic lead occurs primarily through food and drinking water, although exposure via soil, dust, air and paint chips significantly contribute to the overall exposure.

The widespread occurrence of lead in the environment is primarily a result of anthropogenic activities. With the decline in combustion of leaded fuel and the phasing out of lead in pipes and paints, industrial emissions from mining, smelting, recycling or waste incineration are the major source of environmental lead.

Lead in water may result from industrial sources, but urban runoff significantly contributes to the total burden and solid wastes such as ammunition, leaded paints as well as industrial sources all contribute to the levels of lead found in soil.

Flaking paint, paint chips and powdered paint are major sources of lead exposure in young children. Other domestic sources of exposure include the contamination of food and drink from contact with utensils such as earth-glazed pottery.

Occupational exposure to lead and inorganic lead compounds may occur in a variety of occupations, including steel welding and spray coating, battery manufacturing or plumbing.

Most people are exposed to lead or lead compounds by eating or drinking contaminated food or drink, or breathing it in the air, such as from exhaust fumes, although the use of leaded fuel is declining. Children are mainly exposed to lead from eating soil.

The harmful effects that may occur from lead largely depend on how much people have been exposed to and for how long, therefore the amount of lead in the blood is often measured.

Eating food or drink or breathing in air contaminated with lead or lead compounds for a short period usually does not cause any ill effects. In rare cases nausea, vomiting, diarrhoea or kidney damage may occur.

If exposure continues for a long time people may become anaemic, lethargic and irritable or show other symptoms such as headache, muscle tremors, kidney or liver damage, nausea, vomiting or high blood pressure. Being exposed to lead for a long time can also affect both male and female reproduction, leading to miscarriage, stillbirths or premature births.

Children exposed to lead when in the womb or during the first few years of life due to eating paint chips containing lead, may have a lower IQ, behavioural problems or nerve damage. Children with high amounts of lead in their bones may have delayed growth.

Lead and its compounds are classified as probable carcinogens by the International Agency for Research on Cancer as lung, bladder and kidney cancer was seen in workers occupationally exposed to lead.

Production and Uses

Key Points

- Metallic lead is used in storage batteries, cables and in electronic equipment
- Inorganic lead salts are used in the production of pesticides, paint, ceramics, glass, plastic and rubber products

Metallic lead is used in storage batteries, cables, solders and steel products, ammunition, shielding systems from radiation and x-rays, circuit boards in computers and electronic equipment, and superconductor and optical technology. Inorganic lead salts are used in insecticides, pigments, paints, ceramics, enamels, glass, plastics and rubber products.

Frequently Asked Questions

What is lead?

Lead is a metal that is widely distributed in the earth's crust (soil and rocks), air and water. It is largely emitted into the environment as inorganic salts. Exposure to inorganic lead occurs primarily through food and drinking water, although exposure via soil, dust, air and paint chips significantly contribute to the overall exposure.

What is lead used for?

The use of lead in petrol, paint and pipes has now been phased out. It is now used in occupations such steel welding, battery manufacturing and plumbing and as part of glazings for pottery.

How does lead get into the environment?

Lead predominantly gets into the environment as a result of industrial emissions from mining, smelting, recycling or waste incineration.

How will I be exposed to lead?

Most people are exposed to lead by eating or drinking food or drink containing lead. In addition, lead may be inhaled in lead-contaminated air, such as exhaust fumes. In children, the ingestion of flaking paint, paint chips or soil is the major source of exposure. People working in industries that use lead may breathe it in the air.

If there is lead in the environment will I have any adverse health effects?

The presence of lead in the environment does not always lead to exposure as you must come into contact with the chemical. Clearly, in order for it to cause any adverse health effects you must come into contact with it. You may be exposed by breathing, eating, or drinking the substance or by skin contact. Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Eating food or drink or breathing in air contaminated with lead or lead compounds for a short time usually does not cause any ill effects. In rare cases it may cause nausea, vomiting, diarrhoea or kidney damage.

Exposure over a long period may cause people to become anaemic, lethargic and irritable or cause headaches, muscle tremors, kidney or liver damage, nausea, vomiting or high blood pressure.

Can lead cause cancer?

The International Agency for the Research on Cancer classified lead and its compounds as probably carcinogenic to humans, as lung, bladder and kidney cancer was seen in workers occupationally exposed to lead.

Does lead affect children or damage the unborn child?

Children who are exposed to lead in the womb or during the first years of life may have a lower IQ, behavioural problems, nerve damage or delayed growth. The underlying assumption is that no exposure to lead is completely harmless. Being exposed to lead for a long time can also affect both male and female reproduction, leading to miscarriage, stillbirths or premature births.

What should I do if I am exposed to lead?

It is very unlikely that the general population will be exposed to a level of lead high enough to cause adverse health effects.

This document from the HPA Centre for Radiation, Chemical and Environmental Hazards reflects understanding and evaluation of the current scientific evidence as presented and referenced in this document.