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# MONTHLY SAFETY BRIEF: LEAD AWARENESS

Every so often with our safety briefs we pick out a specific contaminant that we commonly work with and focus on understanding the basics. This safety brief is about lead. All departments have projects that deal with lead issues; whether it be lead paint sampling or remediation in the ENV group, lead air monitoring in IH/IAQ, or water sampling for lead in Environmental Assessments.

Our first Technical Brief last month was on lead wipe sampling and analysis. This safety brief covers some basics on the chemical lead, how lead effects the body, factors of exposure, occupational exposure limits, and how to protect yourself from exposure.

## General Hazard Information

We all know that lead is a contaminant and we want to avoid exposure to potential airborne and ingestion hazards to lead (dusts and fumes). Attached is a fact sheet by ATSDR which provides some good general information on lead and lead exposure for your review.

You should also be aware of the common occupational exposure limits for lead in air and other regulated levels in water, dust and soil. The following is a summary of these lead level references that you should be familiar with:

## Air

### Occupational Exposure Limits (OELs)

OSHA has specific standards covering lead exposure in both the General Industry Standard 29 CFR 1910.1025 and Construction Industry Standard 29 CFR 1926.62. Exposure limits are the same and are:

- Permissible Exposure Limit (PEL) of 0.5 mg/m3 (50 ug/m3)
- Action Level (AL) of 0.3 mg/m3 (30 ug/m3)

## Water

### Maximum Contaminant Levels (MCLs)

Under the Safe Drinking Water Act (SDWA), the US EPA regulates various contaminants including lead for drinking water via the National Primary Drinking Water Regulations (NPDWRs or Primary Standards). NPDWRs or Primary Standards are legally enforceable standards that apply to public water systems.

- US EPA for Public Water Systems: Action Level (AL) of 0.015 ppm [15 ppb]
- US EPA for School Water Systems: Action Level (AL) of 0.020 ppm [20 ppb]

## Dust

### OSHA and HUD Guidelines

For general workplace comparison, the OSHA Lead Standard states "All surfaces shall be maintained as free as practicable of accumulations of lead.". There are many project specific factors that go into the evaluation of a lead wipe sample in an occupational environment. We would expect much different results in an industrial environment that deals with lead versus a commercial office or a residential lead contamination issue.

In a Compliance Interpretation letter, OSHA (Industrial) has indicated that surfaces including eating and other direct contact surfaces would not need to be cleaner than 200 μg/ft² of lead.

For housing projects, HUD has established the following "clearance" levels following lead remediation:

- Non-Industrial Floors: 40 μg/ft²
- Non-Industrial Interior Windowsills: 250 μg/ft²
- Non-Industrial Window Troughs: 400 μg/ft²

**Soil**

**Tiered Approach to Corrective Action Objectives (TACO)**

TACO is the IEPA's method for developing remediation objectives for contaminated soil and groundwater. These remediation objectives protect human health and take into account site conditions and land use. Remediation objectives generated by TACO are risk-based and are applicable to different types of land uses including: residential property use, industrial commercial property use, and a construction worker setting.

The following are the TACO levels established for lead in soil:

- TACO Tier 1 SRO for Residential Property: 400 mg/kg
- TACO Tier 1 SRO for Industrial-Commercial Property Use: 800 mg/kg
- TACO Tier 1 SRO for Construction Worker Setting: 700 mg/kg

So, basically what this means for example is that if a soil that a construction worker is going to come into contact with has above 700 mg/kg of lead, they would need a site safety plan and appropriate PPE for their situation (in Illinois). This would likely include air sampling for lead exposure under OSHA.

# Lead - ToxFAQs™

## What is lead?

Lead is a naturally occurring metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment, including air, water and soil. Lead can exist in many different chemical forms.

Lead is used in the production of batteries, ammunition, and metal products (solder and pipes). Because of health concerns, use of lead in paints, ceramic products, caulking, and pipe solder has been dramatically reduced. The use of lead as an additive to automobile gasoline was banned in 1996 in the United States.

## What happens to lead in the environment?

- Lead is an element and, therefore, it does not break down.
- When lead is released to the air, it may be transported long distances before it deposits onto the ground.
- Once deposited, lead often adheres to soil particles.
- Lead in soil can be transported into groundwater, but the amount of lead that moves into groundwater will depend on the chemical form of lead and soil type.

## How can I be exposed to lead?

- Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder which can leach into the water.
- Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can form lead dust which can be ingested.
- Spending time in areas where the soil is contaminated with lead.
- Working in a job where lead is used or participating in certain hobbies in which lead is used, such as making stained glass.
- Using health-care products or folk remedies that contain lead.

Lead can affect almost every organ and system in your body

## How can lead affect my health?

The effects of lead are the same whether it enters the body through inhalation or ingestion. Lead can affect almost every organ and system in your body. The nervous system is the main target for lead toxicity in adults and children. Long-term exposure can result in decreased learning, memory, and attention and weakness in fingers, wrists, or ankles. Lead exposure can cause anemia and damage to kidneys. It can also cause increases in blood pressure, particularly in middle-aged and older individuals. Exposure to high lead levels can severely damage the brain and kidneys and can cause death. In pregnant women, exposure to high levels of lead may cause a miscarriage. High-level exposure in men can damage reproductive organs.

# Lead

## How can lead affect children?

Children are more vulnerable to lead poisoning than adults because their nervous system is still developing. Children can be exposed to lead in their environment and prior to birth from lead in their mother's body. At lower levels of exposure, lead can decrease mental development, with effects on learning, intelligence and behavior. Physical growth may also be decreased. A child who swallows large amounts of lead may develop anemia, severe stomachache, muscle weakness, and brain damage. Exposure to lead during pregnancy can result in premature births. Some effects of lead may persist into adulthood.

## Can lead cause cancer?

There have been several agencies and organizations both in the United States and internationally that have reviewed studies and made an assessment about whether lead can cause cancer.

- The Department of Health and Human Services (HHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens
- The U.S. Environmental Protection Agency (EPA) has classified lead as a probable human carcinogen.
- The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans, and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

## Can I get a medical test to check for lead?

A blood test is available to measure the amount of lead in your blood. Blood tests are commonly used to screen children for lead poisoning. Your doctor can draw blood samples and send them to appropriate laboratories for analysis.

## How can I protect my family from lead exposure?

- Avoid exposure to sources of lead.
- Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.
- If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

## Want more information?

Go to ATSDR's Toxicological Profile for Lead

CDC Lead Poisoning Prevention Program https://www.cdc.gov/nceh/lead/default.htm

Environmental Protection Agency https://www.epa.gov/lead/protect-your-family-exposures-lead

Call **CDC-INFO** at 1-800-232-4636, or submit your question online at https://wwwn.cdc.gov/dcs/ContactUs/Form

Go to ATSDR's Toxic Substances Portal: http://www.atsdr.cdc.gov/substances/index.asp

If you have any more questions or concerns, you can also find & contact your ATSDR Regional Representative at http://www.atsdr.cdc.gov/DRO/dro_org.html

## LEAD Awareness QUIZ

1) Which of the following are common routes of exposure to Lead?
   a. Eating food or drinking water that is contaminated with lead.
   b. Spending time in areas where lead-based paint has been used and is deteriorating.
   c. Participating in certain hobbies such as making stained-glass.
   d. All of the above.

2) What are common uses of Lead today? (Circle all that apply).
   a. Batteries
   b. Gasoline additives
   c. Ammunition
   d. Solder and pipes

3) A Lead concentration of 0.030 ppm [30 ppb] is acceptable for a Public Water System.
   ☐ True
   ☐ False

4) The OSHA Lead Standard states "All surfaces shall be maintained as free as practicable of the accumulations of lead".
   ☐ True
   ☐ False

5) Remediation objectives generated by TACO only apply to industrial-commercial property use and construction worker settings.
   ☐ True
   ☐ False

**Instructor(s) – John Feller, CIH, CSP**

**SCORE: PASS / FAIL**

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| Employee Signature | Supervisor Signature | Date |