



LEAD IN THE ENVIRONMENT

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Florida Department of Environmental Protection



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

About the Florida Department of Environmental Protection (DEP)

DEP is the state's lead agency for environmental management and stewardship, protecting our air, water and land. DEP is divided into three primary areas:

- **Land and Recreation.**
- **Regulatory.**
- **Ecosystems Restoration.**

DEP's mission is to protect, conserve and manage the state's natural resources and enforce its environmental laws. DEP's vision is to advance Florida's position as a world leader in protecting natural resources while growing the state's economy. DEP's values are leadership, integrity, accountability, communication, innovation and service.



WHAT IS LEAD?

- **Element (metal)**
- **Atomic # 82**
- **Atomic mass 207.2**
- **Four stable isotopes**
- **204, 206, 207, 208Pb**





WHAT IS LEAD?



- **Metallic appearance**
- **Four electrons in the outer shell**
- **Seven oxidation states from -4 to +4**
- **Readily combines with other metals**
- **Primary ore occurs with sulfur, silver and zinc**



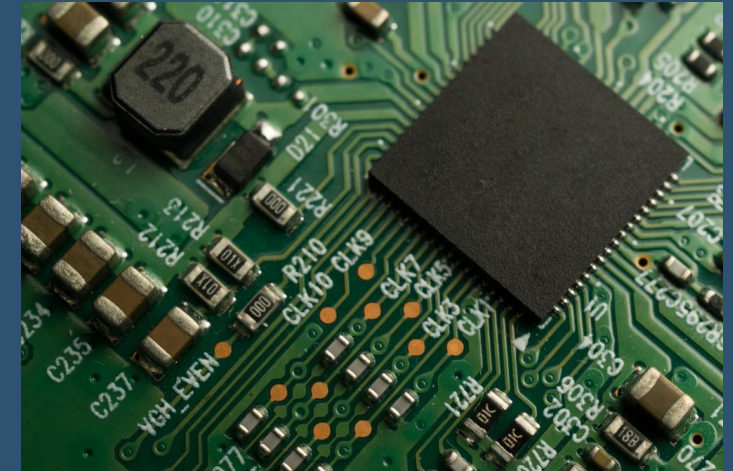
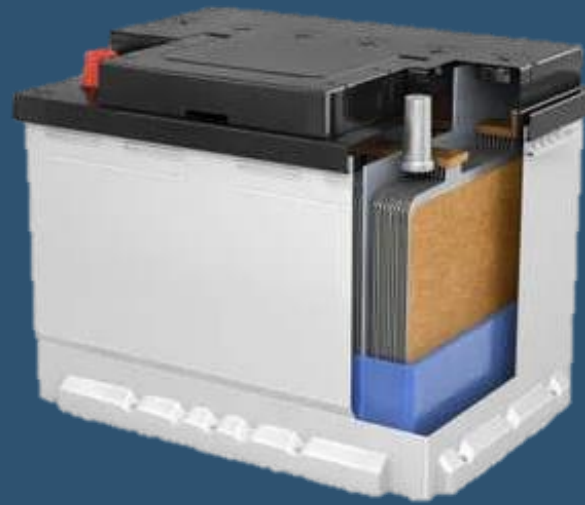
MOST COMMON FORMS OF LEAD

- **Oxides**
- **Sulfide**
- **Carbonate**
- **Organolead (tetramethyllead and tetraethyllead)**
- **Metallic lead**



USES AND SOURCES

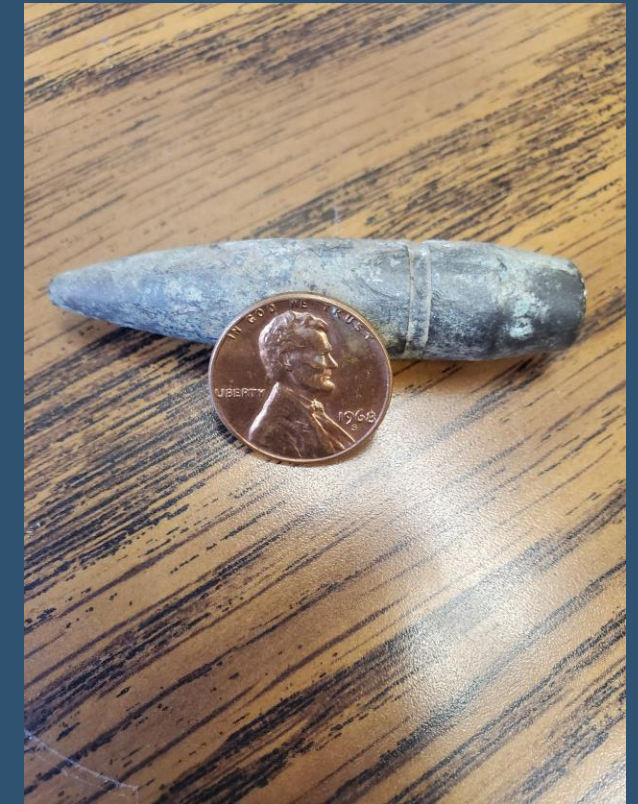
- **Lead-acid batteries**
- **Radiators (solder)**
- **Pigments (white lead, red lead)**
- **Plumbing (solder, pipes)**
- **Pottery glazes**
- **CRTs/circuit boards (e-waste)**





USES AND SOURCES

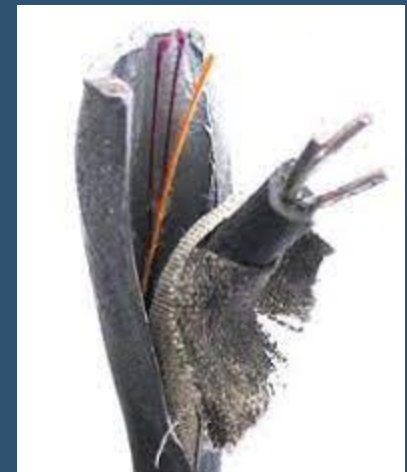
- **Leaded gasoline**
- **Detonating compounds**
- **Ammunition**
- **Babbitt metal (engine bearings/used oil)**
- **Printing**
- **Roofing materials**





USES AND SOURCES

- Lead crystal
- Metal shavings
- Lead shielding (X-rays and electrical cables)
- Stained glass windows
- Cosmetics





SOURCES

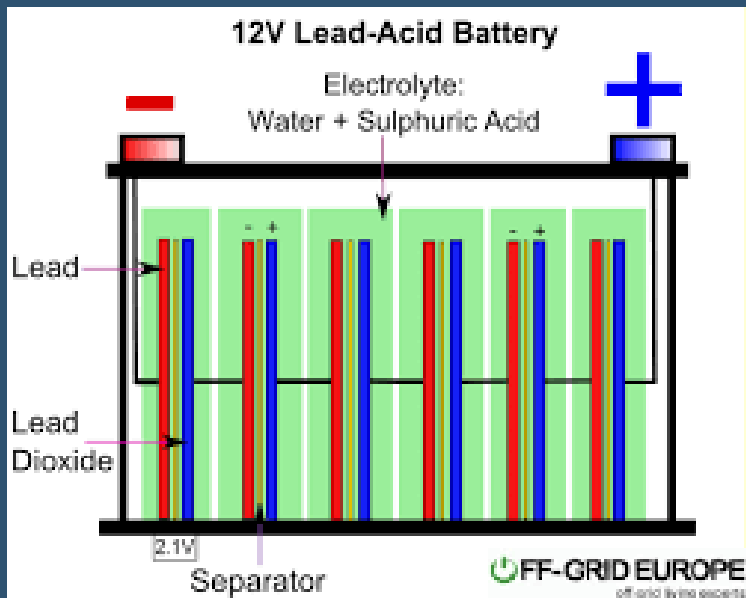
- Air emissions
- Lead, silver, zinc smelting
- Burning leaded fuel
- Incinerators





CO-CONTAMINANTS

- Total Recoverable Petroleum Hydrocarbons (TRPH) from used oil
- Arsenic, cadmium and chromium from used oil
- Arsenic and antimony alloy in lead-acid batteries
- Tin and antimony from projectiles





SOILS

- **Florida's Soil Cleanup Target Level**
- **Direct exposure**
- **Residential (400 mg/kg)**
- **Commercial (1400 mg/kg)**

- **Groundwater leachability not defined**
- **Determined by SPLP instead**



DRINKING WATER

- Primary drinking water standard is 15 $\mu\text{g}/\text{L}$
- Chronic and acute ingestion exposure
- Children Most Susceptible
- Lead and copper leaching
Resulted in the lead and copper rules



RCRA CONSIDERATIONS

- **Resource Conservation and Recovery Act (RCRA)**
- **Concentrations above 100 mg/Kg in soils**



LEAD



04/20/2021



04/20/2021



LEAD





LEAD



Hand-held XRF



LEAD



Cooled pool of lead



Lead smelting dross



WHY IS THIS IMPORTANT?

Guidance for Comparing Background and Site Chemical Concentrations in Soil



<https://floridadep.gov/waste/district-business-support/documents/guidance-comparing-background-and-site-chemical>

The purpose of this guidance is to describe procedures DEP has found acceptable for the comparison of contaminant concentrations in soil between site and background.



THANK YOU

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