

# CIMCOOL<sup>®</sup>

# Technical Report

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## **LEAD (Pb): In the Metalworking Environment**

### **Description of Lead**

Lead is a very soft and malleable blue-grey metal that is partially soluble in water.

Pure lead (Pb) is a chemical element and a heavy metal. Lead can combine with many other materials to form numerous chemical compounds.

Occupational exposure to lead may occur in various ways, including; machining or grinding lead containing metals, melting pure lead, molding, soldering, removal or encapsulation of lead and/or lead containing compounds. There have even been cases where lead babbitts have fallen into a metal removal fluid sump or system leading to significant buildup of lead content in the metal removal fluid. If lead based metals or alloys containing lead are machined and/or ground and a water based metalworking fluid is used, dissolved lead should be expected in the fluid mix. To help control the lead buildup in a metalworking fluid mix, effective removal of the metal fines and chips, as they are produced, is required.

Exposure to lead in the occupational setting usually occurs through inhalation or ingestion. The most common route for occupational lead exposure is inhalation. Lead, as a dust or mist, in the air, can be inhaled and absorbed through the upper respiratory tract and lung. The proper use of metalworking fluids will help reduce dust and airborne lead exposure. Inorganic lead is usually not absorbed through the skin.

### **Metalworking Industry Related Occupations with potential Lead Exposure (partial list)**

Auto Body Workers  
Glass Manufacturers  
Lubricant Manufacturers  
Machinists  
Bearing Manufacturers

### **Metals or Alloys that may contain lead (partial list):**

Powdered metals  
Tin Alloys  
Brass  
Bronze  
Copper Alloys

### **Regulatory Implications**

Under federal and state regulations employers have a responsibility to ensure that workers are protected from harmful levels of lead exposure.

The National Institute of Occupational Safety and Health (NIOSH) considers "Lead" to mean metallic lead, lead oxides, and lead salts (including lead salts such as lead soaps but excluding lead arsenate). The NIOSH Recommended Exposure Limit (REL) for lead (10-hour Time Weighted Average [TWA]) is 0.100 mg/m<sup>3</sup>; air concentrations should be maintained so that the worker blood lead level remains less than 0.60mg Pb/100 g of whole blood.

The Occupational Safety and Health Administration (OSHA) considers "Lead" to be metallic lead, all inorganic lead compounds (lead oxides and lead salts), and a class of organic compounds called soaps; all other lead compounds are excluded from this definition. The OSHA Permissible Exposure Limit (PEL) (8-hour TWA) is 0.050 mg/m<sup>3</sup>; other OSHA requirements can be found in 29 CFR 1910.1025. The OSHA PEL (8-hour TWA) for lead in non-ferrous foundries with less than 20 employees' is 0.075 mg/m<sup>3</sup>.

Lead is a typically regulated inorganic pollutant that may be found in used metal removal fluids. Lead may be removed from a used metalworking fluid or oily wastewater through chemical treatment. Evaporation of used metalworking fluids or oily wastewater may also be utilized to treat metal-contaminated fluids for disposal. Procedures for disposal of metalworking fluids and related wastes must comply with local, county, state and federal regulations.

Manufacturing wastes should be screened for the presence of lead. EPA has defined lead levels over 5 ppm as hazardous waste. Lead in liquid test kits\* may be used to quickly screen liquids for non-quantitative results. Use of these kits should not replace laboratory analysis.

\*Lead in Liquid Check Test Kits may be purchased from SKC Inc., phone 1-800-752-8472