

It's frightening but true. 840,000 Workers are exposed to lead each year, and Asbestos exposure is the number one cause of work-related deaths worldwide. More than 39,000 American lives are lost to asbestos-related diseases every year. About 1.3 million U.S. workers are potentially at risk of workplace exposure.

On construction projects, Lead exposure can come from paintings and coatings, lead mortars, abrasive blasting, and plumbing materials.

The most serious hazard with lead is that it can quickly become airborne.

LEAD EXPOSURE

- Some construction site tasks that can expose workers to lead would be demolition and renovation projects where the structures have lead-painted surfaces.
- Paint Removal or spray painting with lead-based paint.
- Sandblasting steel structures. This is because lead-based paint is typically what's being removed.
- Grinding, cutting, and torching metal surfaces that have been painted with lead.
- Welding, cutting, or removing pipes, joints, or ductwork that contain lead.
- Lead soldering
- Cutting or stripping lead sheath cable
- Cleaning up construction sites where there is lead dust is obviously a serious hazard.

Exposure to lead occurs through breathing lead dust, breathing, or ingesting the flumes or mist—getting lead dust on your hands and then in your mouth from cigarettes and chewing tobacco. Lead dust is even found in some makeups and can get in food when it becomes airborne.

When working on Government Construction projects, all painted surfaces are presumed to contain lead. For this reason, all paint samples are analyzed by a lab before the project's starts. This analysis will require input from a certified industrial hygienist. Detecting even a tiny amount of lead will trigger requirements that must be followed.

These requirements can be for the smallest of tasks such as manual paint scraping and sanding as well as drywall demolition.

AIR SAMPLING

The contractor is required to conduct air sampling to determine lead exposure during these tasks and other tasks that could result in lead exposure. Until exposures are determined, workers must wear respirators that are appropriate to the task. Depending on where the lead is located, the contractor may choose to avoid working in the area where lead has been found.

Or, if this work is on a Military Project, the Government may require a lead abatement specialist to reduce or eliminate lead exposure altogether.

All workers who may be exposed to lead must be trained in lead hazards. This training will occur before the work.

The results of air sampling are used to determine if workers are exposed to lead above the action level, called AL of 30 micrograms per cubic meter of air, or above the permissible exposure limit, or PEL, of 50 micrograms of lead per cubic meter of air, averaged over an 8-hour shift. Exposures above the A.L. or PEL will trigger additional requirements including:

Washing facilities for hands and face and additional worker training such as engineering controls and proper housekeeping, sanitation, and washing facilities for hands and face.

This will also require additional worker training. Personal Protective Equipment, medical monitoring with additional air sampling, and a written safety plan for projects which may expose workers to lead.

COMPLIANCE PROGRAMS

Written compliance programs must be reviewed and updated every 6-months. These programs must include a description of activities where lead can potentially be emitted, operating and maintenance procedures and a means to achieve project compliance. Engineering plans and studies that were used to determine the controls that have been selected, information on the technology considered to meet the PEL and frequent job site inspections, materials, and equipment by a Competent Person.

A chemical with any of the following characteristics can be defined as a hazardous chemical.

Air Monitoring

Air monitoring, a detailed schedule, administrative control schedule, of needed, and arrangements made on multi-employer sites to inform employees of potential lead exposure must be included in the Written Program.

At risk activities for exposure are disturbing paint on structures built before 1978, demolition, salvage, removing or installing materials that contain lead, emergency cleanup of lead, transporting lead materials, and maintenance activities.

Trigger tasks can expose workers to extreme amounts of lead. Examples of trigger tasks are cutting with a torch, heat gun work, manual sanding, manually scraping dry materials, and sanding with or without a dust collection system.

For each activity where employee exposure exceeds the PEL, the employer must establish and implement a written compliance program to reduce employee exposure, keeping it under the

PEL. The compliance program must ensure frequent and regular inspections of job sites, materials, and equipment by a Competent Person.

Written programs, which must be reviewed and updated at least every six months, must include: a description of each activity in which lead is emitted. The means to achieve compliance along with engineering plans and studies used to determine which engineering controls to use and where they'll be required. The program must also include information on the technology considered to meet the PEL and air monitoring data to document the source of lead emissions.

A detailed schedule for implementing the program. Including copies of documentation like purchase orders for equipment and construction contracts, A work practice program that includes a hazardous materials management plan, and an administrative control schedule if applicable. On multi-contractor sites, air monitoring data that document the source of lead emissions must be included in the program.

RISK ACTIVITIES

Examples of Risk Activities include:

- disturbing paint on structures built before 1978
- demolition and salvage work
- removing or encapsulating lead-containing material
- installing products containing lead
- renovating facilities containing lead
- emergency cleanup of lead-contaminated materials
- transporting, storing, or disposing of lead-containing materials where construction activities are performed
- Maintenance associated with at-risk activities.

Trigger Tasks

We also have to consider what is known as trigger tasks. Trigger tasks can expose workers to extreme amounts of lead. Some examples would be torch cutting, heat gun work, manual sanding, manual scraping dry materials, and sanding, with or without a dust collection system.

If the evaluation shows a potential for activities to generate unacceptable occupational exposure to lead, a written lead compliance plan must be submitted & accepted prior to the work.

This plan describes the procedures to be followed to protect workers from lead hazards while performing lead hazard control activities.

If the evaluation shows the potential for activities to disturb ACM, an asbestos abatement plan shall be developed in accordance with 29 CFR 1910.1001; 29 CFR 1926.1101; and 40 CFR 61, Subpart M.

This plan describes the procedures to be followed to protect workers from lead hazards while performing lead hazard control activities and is written by the subcontractor doing the work.

Both lead and asbestos sources are to be labeled as lead or asbestos hazards that should not be disturbed without proper protection. If infeasible to label each source, a site map may be posted that points out the location of the lead and asbestos hazards.

No asbestos-containing materials shall be used or brought onto any USACE or NAVFAC projects. Lead-based paints shall only be used with written approval of the GDA or USACE SOHO and shall never be used inside a residence, childcare facility, or medical treatment facility.

Asbestos workers have increased chances of getting two types of cancer: cancer of the lung tissue itself and mesothelioma. These diseases do not develop immediately following exposure to asbestos but appear only after several years.

Asbestos fibers are released into the air during activities that disturb asbestos-containing materials. These fibers can then be inhaled without knowing and trapped in the lungs. If swallowed, they can become embedded into the digestive tract as well.

Some construction materials are presumed to contain asbestos if installed before 1981. Examples of these materials, as well as other presumed asbestos-containing materials are:

Thermal System Insulation, and industrial pipe wrapping
Roofing and siding shingles
Vinyl floor tiles
Plaster cement, putty and caulk
Ceiling tiles and spray on coating; and Maintenance projects.

All construction or maintenance projects will be evaluated for the potential to contact Asbestos and Lead.

Before work begins, If there's potential for ACM exposure, an Asbestos Control Plan shall be developed using the age of the buildings, building supplies for the period, location, and observations of debris or demolition areas

An industrial hygienist must write an asbestos control plan with asbestos training or an A.H.E.R.A. trained supervisor or manager. It must also address control mechanisms, such as wetting with water or surfactant, posting, worker & community protection, air sampling, and safe transport and disposal.

A substance with one of the following harmful effects is classified as a health hazard:

- Toxicity in the short term
- irritation or skin corrosion
- Severe eye irritation or damage
- Sensitivity of the lungs or skin
- Mutagenicity of germ cells
- A substance with carcinogenic potential
- A chemical that's toxic to the reproductive system or other organs or if it poses an aspiration risk.

A simple asphyxiant is a material or mixture that can cause oxygen deprivation in people exposed to it, resulting in unconsciousness or death.

HARMFUL CHEMICALS ON THE PROJECT SITE









Employers must maintain a list of harmful chemicals at the workplace. Each chemical in this list needs to include the date the chemical was received at the workplace and the Manufacturer's product name. In multi-employer workplaces, where other employer's employees could be exposed, processes must be in place to notify the other employer or employers of the hazards as well.

LABELING

Who is responsible for labeling containers? Would it be the manufacturer, the importer, or the wholesaler? If you're thinking it's the employer's responsibility, you're right! When the containers arrive, employers must make sure every container of hazardous chemicals is properly labeled. There are a couple of exceptions. And that's if the containers are non-portable, or if portable containers into which hazardous chemicals are transferred from labeled containers for the employee executing the transfer's immediate usage.

Employers must comply with the following requirements when employees handle chemicals in sealed containers that are not opened under regular conditions of use: Make certain all inbound containers are labeled, keep copies of any safety data sheets that arrive with sealed container shipments, and if an employee wants to review a safety data sheet, provide them with the datasheet as quickly as feasible.

The product Identifier is a unique way for a user to recognize a hazardous substance.

CHEMICAL NAME			
SIGNAL WORD Use Only One			
<input checked="" type="checkbox"/> DANGER		<input type="checkbox"/> WARNING	
 <input type="checkbox"/>	 <input type="checkbox"/>	 <input type="checkbox"/>	 <input type="checkbox"/>
 <input type="checkbox"/>	 <input type="checkbox"/>	 <input type="checkbox"/>	 <input type="checkbox"/>
HAZARD STATEMENT			
PRECAUTIONARY STATEMENT		See Safety Data Sheet	

Product Identifier

It could be a number or a name. The product identifier on the label and the safety data sheet must be the same. The word "danger" is used to describe more serious dangers. For less serious dangers, "warning" is used.

A "hazard statement" specifies the nature of the chemical's dangers, including the degree of hazard where applicable. For products that pose more than one hazard, the label must provide an appropriate hazard statement for each hazard categorization.

The words: fatal if swallowed, toxic if it comes into contact with the skin, Toxic if inhaled, prolonged or repetitive exposure to this substance may cause organ harm, causes severe skin rashes, and damage to the eyes. Explosive, with a high risk of projection, Highly flammable substance, Heating can result in a fire, or oxidizers can start or aggravate a fire, are examples of hazardous statements.

A "precautionary statement" is a term that specifies the precautions that should be taken to reduce or eliminate the negative effects of exposure to a hazardous substance or inappropriate storage or handling.

There are four types of precautionary statements: Prevention, which would be how to minimize exposure. Response, such as what to do in the case of accidental spillage including first aid. Finally there's storage and disposal. Bold print must be utilized for the statement's main points and plain text for any extra information needed.

A "pictogram" is a symbol designed to convey detailed information about a chemical's risks. Pictograms are squares with a point in the middle and a black hazard symbol on a white background surrounded by a red frame.

On a hazardous chemical label, there are nine different pictograms: An exploding bomb, a gas cylinder, an exclamation point, a flame, corrosion, health hazard, oxidizing, skull and crossbones, and environment

For each hazardous chemical produced or imported, chemical manufacturers and importers must create or receive a Safety Data Sheet (SDS). And, for any hazardous chemical used in the workplace, employers must have an SDS on file.

SAFETY DATA SHEETS

Safety data sheets are required when the first dangerous chemical arrives onsite; and
With the first shipment following the upgrade of an SDS; and
At the request of an employer.

Employers must guarantee that SDSs for each hazardous chemical on site are easily available to employees when they are in their job zones during each work shift.

Electronic access is allowed as long as there are no restrictions to immediate employee access.

HAZARD COMMUNICATION PROGRAM

The written Hazard Communication program must address the following: Labels, how will the company address labeling requirements? Where will the SDS be located? What's the process of taking delivery of hazardous materials, labeling, and storing them? Who is tasked with training employees, and how often will training occur?

In the HazCom Program, the employer must agree to maintain a list of all hazardous chemicals known to be present in the workplace. The employer also agrees to use the product identifier to prepare the list to make it easy to track the status of SDSs and labels of a particular hazardous chemical.

TRAINING

Employees must be trained by their employers, at the time of initial assignment, to a work environment containing hazardous substances; and anytime a new hazard enters the work environment. In training, the following information must be provided to all employees:

- The Hazard Communication Standard's clauses

- Harmful chemicals in their work environment
- The written Hazard Communication Program's location and accessibility
- Necessary hazardous chemical list location
- The Safety Data Sheet location

Also included in training must be the methods used to detect the presence or release of a hazardous chemical. For example:

- There might be employer-conducted surveillance
- Monitoring devices for continuous monitoring
- Safe working procedures
- Personal Protective Equipment
- Shipping container labels
- Workplace labeling, and how to gather and apply relevant danger information.

Hazardous chemicals pop up in most workplaces. They're used to manufacture many of the products we use on a day-to-day basis. This means there is a real potential for accidents, incidents, and injuries when people work with, or in the vicinity of, hazardous chemicals. But, by knowing and understanding the basic nature of those chemicals and how to safely work with or around them, employees can greatly decrease any risk that might be present.

HEARING PROTECTION

Hearing protection must be worn when an employee's noise exposure cannot be reduced to safe levels. There are several options for hearing protection available that include ear plugs, ear-muffs, and hearing bands, also known as canal caps. We'll go into hearing protection in the module on Personal Protective Equipment.

RADIOACTIVE MATERIALS

Any activity involving radioactive materials or X-rays, whether or not under license from the Nuclear Regulatory Commission, must be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under the Commission license, only persons licensed or competent persons under the direction and supervision of the licensee shall perform such work.

Non-Ionizing radiation is Extremely Low Frequency (ELF) radiation and is produced by power lines, electrical wiring, and electrical equipment. Common sources of intense exposure include ELF induction furnaces and high-voltage power lines.

The best control to reduce exposure risk to non-ionizing radiation is elimination. But, if that's not possible, other risk controls to use will be identified in your project's exposure control plan. Creating distance between workers and the radiation source can be effective; shielding is also if the radiation source is not from a specific location.

DUSTS, VAPORS, FUMES, and MISTS

Airborne contaminants can occur in the gaseous form or as aerosols, which include airborne dust, sprays, mists, smokes, and fumes. Airborne dust is particularly concerning because it's associated with occupational lung diseases like pneumoconiosis and systemic intoxications such as lead poisoning, especially at higher exposure levels. There's an increasing occurrence of other dust-related diseases, such as cancer, asthma, allergic alveolitis, and irritation, as well as a range of non-respiratory illnesses, which may occur at much lower exposure levels.

Airborne chemical hazards are concentrations of mists, vapors, gases, fumes, or solids. Some are toxic through inhalation; some irritate the skin on contact; some can be toxic by absorption—through the skin or ingestion, and some are corrosive to living tissue. Chemical vapor in the workplace is also a health hazard to the workers. Workers inhale the vapor, allowing the chemical to enter the bloodstream. Vapor may also cause harm to the skin and other unprotected areas of the body. Examples of vapors found in construction would be gasoline used for fuel—organic Solvents used as paint thinners, and glue solvents.

Soldering

Soldering involves flux; a Flux is a sticky side-product from the distillation of turpentine. Also known as colophony, it consists mainly of abietic acid with smaller quantities of stilbene derivatives, amine hydrochloride activators, and other hydrocarbons. When heated, the side products include hydrochloric acid, benzene, toluene, styrene, phenol, chlorophenol, isopropyl alcohol, and aliphatic aldehydes. 20% of employees who work with or near soldering develop asthma, and studies show it's the leading cause of illness and employee turnover in those industries. Metals also become airborne during soldering. Exposure to lead and other heavy metals can result in sterility, abortion, brain damage, fatigue, irritation, and anemia.

Exposure

Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists, must be avoided. To achieve compliance with what you've learned in this module, administrative or engineering controls must be implemented whenever feasible.

Controls

When controls can't achieve full compliance, protective equipment or other protective measures must be used to keep employee exposure to air contaminants within the limits. Any equipment and technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified people. Whenever respirators are used, they must comply with 1926.103, Respiratory protection. We'll dive into Respiratory Protection in another module within this OSHA 30 Course.

Ventilation

Engineering controls protect workers by removing potentially hazardous conditions or erecting barriers between workers and hazards. One example is local exhaust ventilation to capture and remove airborne emissions, as are machine guards to protect the worker. All employees working in and around open-surface tank operations must be trained in open-surface tank hazards, first aid procedures, and task-specific personal protective equipment. When hazardous substances such as dust clouds, fumes, mists, vapors, or gases exist or are produced during construction work, their concentrations must not exceed the limits specified in 1926.55a. Tables 1 and 2 from this section have been included in at the end of this section.

If it is necessary to enter a tank containing a hazardous atmosphere in an emergency, such as rescue work, suitable respirators, such as a self-contained breathing apparatus hose masks with a blower, should be worn. Employees must use respirators that reduce their exposure to a level

below the limits in 1926.55(a) or be provided adequate oxygen if there is a risk of oxygen deficiency.

Respirators must be provided in marked; quickly accessible storage compartments built for this purpose when the possibility of accidental release of hazardous concentrations of air contaminants exists. Respirators must be approved by NIOSH and selected by a competent industrial hygienist or other technically qualified source and used by 29 CFR 1926.103, which we'll cover in the Respiratory Protection module of this course.

If a contaminant in the tank can cause dermatitis or be absorbed through the skin, the employee entering the tank shall also wear protective clothing. At least one trained standby employee with a suitable respirator shall be present in the nearest uncontaminated area. The standby employee must be able to communicate with the employee in the tank and haul him out of the tank with a lifeline if necessary.