

## 5.3: Lead and other Elements

### General

Section 1926.62 applies to all construction work where an employee may be occupationally exposed to lead. All construction work excluded from coverage in the general industry standard for lead by 29 CFR 1910.1025(a)(2) is covered by this standard. Construction work is defined as work for construction, alteration and/or repair, including painting and decorating. It includes but is not limited to the following:

1. Demolition or salvage of structures where lead or materials containing lead are present;
2. Removal or encapsulation of materials containing lead;
3. New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;
4. Installation of products containing lead;
5. Lead contamination/emergency cleanup;
6. Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location, at which construction activities are performed, and
7. Maintenance operations associated with the construction activities described in this paragraph.

### Exposure to lead

When lead is absorbed into the body in certain doses it becomes toxic. Lead can be absorbed into the body by inhalation and ingestion. Inhalation of airborne lead is the most common source of occupational lead absorption. For this reason employers shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50  $\mu\text{g}/\text{m}^3$ ) averaged over an 8-hour period.

### Action level

The action level (AL) is the level at which an employer must begin certain compliance activities. For lead, the action level, without regard to the use of respirators, is an airborne concentration of lead of 30 micrograms per cubic meter of air (30  $\mu\text{g}/\text{m}^3$ ) calculated as an 8-hour time-weighted average (TWA).

### Respirator factor of exposure

When respirators are used to limit employee exposure, employee exposure may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

### Employer responsibility

Each employer who has a workplace or operation covered by this standard shall initially determine if any employee may be exposed to lead at or above the action level.

### Written record

Where a determination is made that no employee is exposed to airborne concentrations of lead at or above the action level, the employer shall make a written record of such determination.

### Monitoring

If the initial determination or subsequent determination reveals employee exposure to be at or above the action level, but at or below the permissible exposure limit PEL, the employer shall perform monitoring in accordance with this paragraph at least every 6 months. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level at which time the employer may discontinue monitoring for that employee until there is a change of equipment, process, control, personnel or a new task has been initiated.

### Changes in workplace

Whenever there has been a change of equipment, process, control personnel or a new task has been initiated that may result in additional employees being exposed to lead at or above the action level or may result in employees already exposed at or above the action level being exposed above the PEL, the employer shall conduct additional monitoring.

### Employee notification

Within 5 working days after completion of the exposure assessment the employer shall notify each employee in writing of the results, which represent that employee's exposure level.

Whenever the results indicate that the representative employee exposure without regard to respirators, is at or above the PEL the employer shall include in the written notice a statement that the employee's exposure was at or above that level and a description of the corrective action taken or to be taken to reduce exposure to below that level.

### Respirator use requirements

Where the use of respirators is required under this section the employer shall provide, at no cost to the employee, and assure the use of respirators, which comply, with the requirements of this paragraph. Respirators shall be used in the following circumstances:

1. Whenever an employee's exposure to lead exceeds the PEL;
2. In work situations in which engineering controls and work practices are not sufficient to reduce exposures to or below the PEL;
3. Whenever an employee requests a respirator; and
4. An interim protection for employees performing lead assessments.

### Employee exposure above the PEL

Where an employee is exposed to lead above the PEL without regard to the use of respirators, where employees are exposed to lead compounds which may cause skin or eye irritation (e.g. Lead arsenate, Lead oxide), and as interim protection for employees performing lead assessment tasks, the employer shall provide appropriate protective work clothing and equipment at no cost to the employee and assure that the employee uses them to prevent contamination of the employee and the employee's garments.

### Medical surveillance

The employer shall make available initial medical surveillance to employees occupationally exposed on any day to lead at or above the action level. Initial medical surveillance consists of biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels.

### Employer communication

The employer shall communicate information concerning lead hazards according to the requirements of OSHA's Hazard Communication Standard for the construction industry, 29 CFR 1926.59, including but not limited to the requirements concerning warning signs and labels, material safety data sheets (SDS), and employee information and training.

### Exposure to Asbestos

Asbestos is the name given to a group of naturally occurring minerals that are resistant to heat and corrosion. Asbestos has been used in products, such as insulation for pipes (steam lines for example), floor tiles, building materials, and in vehicle brakes and clutches. Asbestos includes the mineral fibers chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite and any of these materials that have been chemically treated or altered. Heavy exposures tend to occur in the construction industry and in ship repair, particularly during the removal of asbestos materials due to renovation, repairs, or demolition. Workers are also likely to be exposed during the manufacture of asbestos products (such as textiles, friction products, insulation, and other building materials) and during automotive brake and clutch repair work.

### Hazards and Health Effects

Asbestos is well recognized as a health hazard and its use is now highly regulated by both OSHA and EPA. Worker exposures to asbestos hazards are addressed in specific OSHA standards for the construction industry, general industry and shipyard employment sectors. These standards reduce the risk to workers by requiring that employers provide personal exposure monitoring to assess the risk and hazard awareness training for operations where there is any potential exposure to asbestos. Airborne levels of asbestos are never to exceed legal worker exposure limits. There is no "safe" level of asbestos exposure for any type of asbestos fiber.

Breathing asbestos fibers can cause a buildup of scar-like tissue in the lungs called asbestosis and result in loss of lung function that often progresses to disability and death. Asbestos also causes cancer of the lung and other diseases such as Mesothelioma of the pleura which is a fatal malignant tumor of the membrane lining the cavity of the lung or stomach.

## Medical surveillance

Medical surveillance guidance is provided in the following appendix to the OSHA Standards:

29 CFR 1926.1101 - Appendix D, Medical questionnaires; Mandatory

29 CFR 1910.1001 - Appendix D. Medical questionnaires; Mandatory

## Controlling Exposure

Controlling the exposure to asbestos can be done through engineering controls, administrative actions, and personal protective equipment (PPE). Engineering controls include such things as isolating the source and using ventilation systems. Administrative actions include limiting the workers exposure time and providing showers. Personal protective equipment includes wearing the proper respiratory protection and clothing.

## Exposure to Crystalline Silica

Crystalline silica is a common mineral found in the earth's crust. Materials like sand, stone, concrete, and mortar contain crystalline silica. It is also used to make products such as glass, pottery, ceramics, bricks, and artificial stone.

*Respirable* crystalline silica – very small particles at least 100 times smaller than ordinary sand you might find on beaches and playgrounds – is created when cutting, sawing, grinding, drilling, and crushing stone, rock, concrete, brick, block, and mortar. Activities such as abrasive blasting with sand; sawing brick or concrete; sanding or drilling into concrete walls; grinding mortar; manufacturing brick, concrete blocks, stone countertops, or ceramic products; and cutting or crushing stone result in worker exposures to respirable crystalline silica dust. Industrial sand used in certain operations, such as foundry work and hydraulic fracturing (fracking), is also a source of respirable crystalline silica exposure. About 2.3 million people in the U.S. are exposed to silica at work.

## Hazards and Health Effects

Workers who inhale these very small crystalline silica particles are at increased risk of developing serious silica-related diseases, including:

- Silicosis, an incurable lung disease that can lead to disability and death;
- Lung cancer;
- Chronic obstructive pulmonary disease (COPD); and
- Kidney disease.

To protect workers exposed to respirable crystalline silica, OSHA has issued two respirable crystalline silica standards: one for construction, and the other for general industry and maritime.

OSHA's Respirable Crystalline Silica standard for construction requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers.

## Controlling Exposure

The standard provides flexible alternatives, which OSHA expects will be especially useful for small employers. Employers can either use the control methods laid out in Table 1 of the construction standard, or they can measure workers' exposure to silica and independently decide which dust controls work best to limit exposures to the PEL in their workplaces.

Regardless of which exposure control method is used, all construction employers covered by the standard are required to:

- Establish and implement a written exposure control plan that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur.
- Designate a competent person to implement the written exposure control plan.
- Restrict housekeeping practices that expose workers to silica where feasible alternatives are available.
- Offer medical exams-including chest X-rays and lung function tests-every three years for workers who are required by the standard to wear a respirator for 30 or more days per year.
- Train workers on work operations that result in silica exposure and ways to limit exposure.
- Keep records of exposure measurements, objective data, and medical exams.

Construction employers must comply with all requirements of the standard by September 23, 2017, except requirements for laboratory evaluation of exposure samples, which begin on June 23, 2018.

### Permissible Exposure Levels (PEL)

1910.1053(c) and 1926.1153 (d)(1) establish a PEL of 50  $\mu\text{g}/\text{m}^3$  as an 8-hour TWA. Employers must ensure that no employee is exposed to an airborne concentration of respirable crystalline silica above that PEL.

- An action level of 25  $\mu\text{g}/\text{m}^3$  is also established for both standards 1910.1053(b) and 1926.1153(b)

Employers that have fully and properly implemented the engineering controls, work practices, and respiratory protection for each employee performing a task listed in Table 1 of the construction standard 1926.1153(c) do not need to comply with the requirements of 1926.1153 (d), including the PEL.

### Medical Surveillance

Employers must comply with the medical surveillance requirements in Appendix B of 1926.1153.

## Exposure to Cadmium

Cadmium (Cd) is a soft, malleable, bluish white metal found in zinc ores, and to a much lesser extent, in the cadmium mineral greenockite. Most of the cadmium produced today is obtained from zinc byproducts and recovered from spent nickel-cadmium batteries. First discovered in Germany in 1817, cadmium found early use as a pigment because of its ability to produce brilliant yellow, orange, and red colors. Cadmium became an important metal in the production of nickel-cadmium (Ni-Cd) rechargeable batteries and as a sacrificial corrosion-protection coating for iron and steel. Common industrial uses for cadmium today are in batteries, alloys, coatings (electroplating), solar cells, plastic stabilizers, and pigments.

Worker exposure to cadmium can occur in all industry sectors but mostly in manufacturing and construction. Workers may be exposed during smelting and refining of metals, and manufacturing batteries, plastics, coatings, and solar panels.

### Hazards and Health Effects

Occupational exposure to cadmium can lead to a variety of adverse health effects including cancer. Acute inhalation exposure (high levels over a short period of time) to cadmium can result in flu-like symptoms (chills, fever, and muscle pain) and can damage the lungs. Chronic exposure (low level over an extended period of time) can result in kidney, bone and lung disease.

### Controlling Exposure

Workers can be exposed to cadmium by breathing in dusts, fumes, or mists containing cadmium. Cadmium or cadmium compounds can also get on the skin, contaminate clothing or food, and be ingested (which is also one of the routes of exposure). The most effective way to prevent exposure to a hazardous metal such as cadmium is through elimination or substitution.

### Permissible Exposure Level

The employer shall assure that no employee is exposed to an airborne concentration of cadmium in excess of five micrograms per cubic meter of air (5  $\mu\text{g}/\text{m}^3$ ), calculated as an eight-hour time-weighted average exposure (TWA)

Action level (AL) is defined as an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air (2.5  $\mu\text{g}/\text{m}^3$ ), calculated as an 8-hour time-weighted average (TWA)

### Medical Surveillance

The employer shall institute a medical surveillance program for all employees who are or may be exposed at or above the action level and all employees who perform the following tasks, operations or jobs: Electrical grounding with cadmium welding; cutting, brazing, burning, grinding or welding on surfaces that were painted with cadmium-containing paints; electrical work using cadmium-coated conduit; use of cadmium containing paints; cutting and welding cadmium-plated steel; brazing or welding with cadmium alloys; fusing of reinforced steel by cadmium welding; maintaining or retrofitting cadmium-coated equipment; and, wrecking and demolition where cadmium is present. A medical surveillance program may not be required provided the employer meets certain conditions of limiting employee exposure.

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