



OCCUPATIONAL HEALTH HAZARDS

CONSTRUCTION SAFETY POLICY

CAUTION

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1.0 LEAD IN CONSTRUCTION

Overview

The purpose of the Lead in Construction Standard is to protect the work force from illnesses associated with exposure to lead aerosols. Due to environmental protection laws which prohibit the emission of lead dust to the general atmosphere and to communities, the industry has been forced to contain lead dust as well as protect employees. Consequently, the exposure to lead experienced to our employees can reach levels which can be injurious to health.

The standard specifies methods which can reduce and control the employee exposure so that ill health effects are less likely to occur. The requirements of the standard are summarized.

Scope And Application

The Lead in Construction Standard applies to all occupational exposures to lead and all construction work in which lead, in any amount, is present in an occupationally related context. Construction work is defined as work involving construction, alteration, and/or repair, including painting and decorating. Maintenance activities which may expose employees to lead are also covered by the standard.

Workers at the highest risk of lead exposure are those involved in:

- Abrasive blasting
- Welding, cutting and burning on steel structures

Exposure Limits

The action level is the employee exposure, without regard to the use of respirators, to an airborne concentration of a 30 micrograms per cubic meter of air (30 ug/M³), calculated as an 8 hour time weighted average (TWA). If the action level is exceeded, several provisions of the standard must be implemented which includes periodic exposure monitoring, biological monitoring, and employee training. For example, any employees exposed above the action level for more than 30 days must be included in a periodic medical surveillance program.

The permissible exposure limit (PEL) requires that employers take steps to reduce the exposures to lead below 50 ug/M³ averaged over an 8-hour day. OSHA is aware that current engineering controls at lead activity sites cannot guarantee compliance with this objective. Therefore, respiratory protection can be used to supplement engineering controls.

Worker Protections

CON TECH is responsible for developing and/or maintaining a worker protection program. Worker protection program for employees exposed to lead above the PEL includes:

- Hazard determination, including exposure assessment
- Medical Surveillance and provisions for medical removal
- Engineering and work practice controls
- Job-specific compliance programs
- Respiratory protection
- Protective clothing and equipment
- Housekeeping
- Hygiene facilities and practices
- Signs
- Employee information and training
- Recordkeeping

Elements Of A Compliance Program

For each job where employee exposure exceeds the PEL, CON TECH will establish and implement a written compliance program to reduce employee exposure to the PEL or below. The compliance program provides for frequent and regular inspections of jobsites, materials, and equipment by a competent person. Written programs, which must be reviewed and updated at least every six months, include:

- A description of each activity in which lead is emitted (such as equipment used, materials involved, controls in place, crew size, operating procedures, and maintenance practices)
- The means to be used to achieve compliance and engineering plans and studies used to determine the engineering controls selected where they are required
- Information on the technology considered to meet the PEL
- Air monitoring data that documents the source of lead emissions
- A detailed schedule for implementing the program, including copies of documentation
- A work practice program
- An administrative control schedule, if applicable
- Arrangements made among contractors on multi-contractor sites to inform employees of potential lead exposure

Hazard Assessment

CON TECH is required to conduct an initial employee exposure assessment to determine employees are exposed to lead at or above action level based on:

- Any information, observation, or calculation that indicates employee exposure to lead.
- Any previous measurements of airborne lead
- Any employee complaints of symptoms attributable to lead exposure

Objective data and historical measurements of lead will be used to satisfy the standard's initial monitoring requirements.

If lead exposure is determined a full lead safety program will be established in accordance with OSHA regulations.

2.0 SILICA

Overview

Crystalline silica is a ubiquitous substance that is the basic component of sand, quartz and granite rock. Quartz is the second most common mineral in the earth's crust. Quartz is readily found in both sedimentary and igneous rocks. Quartz content can vary greatly among different rock types. For example, granite contains 10-40% quartz, shales have 22% quartz, and sandstones are composed of 70% quartz.

Silica is a general term for a compound silicon dioxide (SiO₂). The most important forms of crystalline silica in terms of health hazards are quartz, cristobalite, and tridymite.

Exposure Monitoring

Air monitoring is necessary to measure worker exposure to respirable crystalline silica and to select appropriate engineering controls and respiratory protection. Air monitoring is also done to determine the effectiveness of controls and if improvement is needed in those controls.

The air sampling methodology for determining the employee exposure to respirable silica dust is fairly complicated with many pitfalls that can compromise the results. To ensure that proper monitoring protocols are followed, an environmental health and safety professional such as an Industrial Hygienist should conduct the air monitoring. The samples taken by the Industrial Hygienist should be analyzed by an AIHA (American Industrial Hygiene Association) approved laboratory. AIHA laboratories are subjected to a scrupulous accreditation process that ensures good quality control.

OSHA requires personal monitoring. This means that the employee wears the air-sampling device. Area sampling can be useful, however, it is not truly indicative of employee exposure.

Generally, an 8 hour time weighted average exposure should be determined for each employee on the basis of one or more breathing zone air samples reflecting a full shift exposure for each shift, for each job classification, and in each work area. However, it is not necessary to monitor every worker exposed to silica dust. A representative fraction of employees can be sampled for their exposure. The industrial hygienist will be familiar with the various sampling strategies and should discuss the advantages and limitations of these methods.

Employees must be notified of the air sampling results within 15 days of their receipt. These results must be carefully reviewed as they may suggest a change in control measures. The industrial hygienist should provide recommendations for silica dust exposure control. The recommendations and the findings of these surveys should be discussed with the employees.

Because there is no substance specific standard for crystalline silica dust, there is no established monitoring frequency. However, if exposures above the permissible exposure limits are determined, it is generally a good practice to perform monitoring at least on a quarterly frequency. Further, additional monitoring should occur whenever there is a change in raw material, equipment, personnel, work practices, or finished product that may result in an additional exposure of employees to respirable silica dust above the calculated permissible exposure limit.

PERSONAL PROTECTIVE EQUIPMENT, HOUSEKEEPING & HYGIENE PRACTICES

Personal Protective Equipment

Personal protective equipment must be provided and consist of appropriate protection for eyes, face, head, extremities, hand, foot, hearing, and the full body. Workers should be provided with disposable or washable work clothes at the jobsite. Workers are to change into clean clothing before leaving the worksite.

Housekeeping

All exposed surfaces should be maintained free of accumulations of silica dust. Dry sweeping and the use compressed air for cleaning surfaces should be strictly prohibited. Surfaces and equipment can be cleaned using wet methods or by vacuuming with a vacuum equipped with a HEPA (high efficiency particulate air) filter.

Hygiene Practices

Hand washing and shower facilities must be provided. Employees should be instructed to shower, if possible, and change into clean clothes before leaving the worksite to prevent contamination of cars, homes, and other work areas. Therefore, there should be clean/dirty change areas with provisions for storing clean clothing. Work clothes cannot be cleaned by blowing or shaking. Instead, they should be vacuumed before removal with a HEPA filter.

To prevent ingestion of crystalline silica, there should be separate eating/lunch facilities that are away from areas of exposure. Food drinks, tobacco products, and unapplied cosmetics should not be used in work areas.

To prevent silica dust exposures from leaving the worksite, employees should be instructed to park their cars where they would not be contaminated with silica or other hazardous substances such as lead.

Respiratory Protection

Respirators are not intended as a permanent means of preventing or minimizing exposure to airborne contaminants. Instead, effective control measures such as substitution of less hazardous substances, automation, use of enclosed systems, local exhaust ventilation, wet methods, and safe work practices should be utilized to minimize exposure to crystalline silica. These methods should be the primary means of protecting workers. However, when controls cannot keep the exposure below the OSHA permissible exposure limits, the control measures should be supplemented with the usage of respirators. Refer to the section on respiratory protection for further guidelines.

Employee Information & Training

The training of employees is required by the Safety Training and Education Standard (1926.21) and the Hazard Communication Standard (1926.59 and 1926.1200). The information and training program should include the following:

- Information concerning the potential physical and health hazards, and adverse health effects of crystalline silica.
- Material safety data sheets for silica masonry products, alternative abrasives, and other hazardous materials.
- Instruction of each employee in the recognition and avoidance of unsafe conditions concerning crystalline silica.
- Discussion about the importance of substitution, engineering controls, work practices, and personal hygiene in reducing crystalline silica exposure.
- Instructions about the proper use and care of personal protective equipment including respiratory protection.
- Details of the Hazard Communication and crystalline silica programs including information on labeling and material safety data sheets.
- Instructions about the purpose and set up of regulated areas marking the boundaries of work areas containing silica.

All employee training should be provided on an annual frequency.

3.0 ASBESTOS

Overview

Asbestos is a name given to a group of minerals which occur naturally as masses of long silky fibers. Asbestos is known for its unique properties of being resistant to abrasion, inert to acids and alkaline solutions, and stable in high temperatures. Because of these attributes asbestos was widely used in construction.

There are three main types of asbestos fibers:

1. Chrysolite(White Asbestos)
2. Amosite(Brown Asbestos)
3. Crocidolite(Blue Asbestos)

There are also three other types of asbestos fibers: Anthophyllite, Tremolite and Actinolite, which are found as contaminants in Asbestos Containing Materials(ACM)

ACM which can be crumbled, pulverized, or reduced to powder by hand pressure is known as friable asbestos. When friable ACM is damaged or disturbed it releases fibers into the air. Airborne asbestos fibers are small, odorless and tasteless. They range in size from .1 to .10 microns in length. Because asbestos fibers are small and light, they can be suspended in the air for long periods of time. People whose work brings them into contact with asbestos may inhale fibers.

The inhalation of asbestos fibers by workers can cause serious diseases of the lungs and other organs that may not appear until years after the exposure has occurred.

OSHA Standards

The Occupational Safety and Health Administration(OSHA) has the following three standards to protect workers from exposure to asbestos in the workplace. CON TECH follows the guidelines established in 29CFR 1926.1101, which covers construction work, including alteration, repair, renovation, and demolition of structures containing asbestos.

The standards for the construction industries classify the hazards of asbestos work activities and prescribe particular requirements for each classification:

- **Class I** is the most potentially hazardous class of asbestos jobs and involves the removal of thermal system insulation and sprayed-on or troweled-on surfacing asbestos-containing materials or presumed asbestos-containing material.

- **Class II** includes the removal of other types of asbestos-containing materials that are not thermal system insulation, such as resilient flooring and roofing materials containing asbestos.
- **Class III** focuses on repair and maintenance operations where asbestos-containing or presumed asbestos-containing materials are disturbed.
- **Class IV** pertains to custodial activities where employees clean up asbestos-containing waste and debris.

Permissible Exposure Limits

Employee exposure to asbestos must not exceed 0.1 fiber per cubic centimeter (f/cc) of air, averaged over an 8-hour work shift. Short term exposure must also be limited to not more than 1f/cc, averaged over 30 minutes. Rotation of employees to achieve compliance with either permissible exposure limit (PEL) is prohibited.

In construction, unless you are able to demonstrate that employee exposures will be below the PELs, you are generally required to conduct daily monitoring for workers in Class I and Class II regulated areas.

Compliance Methods

CON TECH must control exposures to or below the PEL's using engineering controls and work practices to the extent feasible. Where feasible engineering controls and work practices do not ensure worker protection at the exposure levels, you must reduce employees exposures to the lowest levels achievable and then supplement them respiratory protection to meet the PEL's

CON TECH must also establish decontamination areas and hygiene practices for employees exposed above a PEL. In addition, employees may not smoke in work areas that might expose them to asbestos.

Training

CON TECH must provide training for employees exposed above a PEL and for employees involved in each identified work classification. The specific training requirements depend on the particular class of work being performed. Asbestos awareness training must be provided to all employees who perform housekeeping operations covered by the standard.

CON TECH must also provide medical examinations for workers who, for 30 or more days per year, engage in Class I, II, or III work or experience exposure above the PEL.

Record Keeping

CON TECH must keep accurate records of the following:

- All measurements taken to monitor employee exposure to asbestos, for 30 years.
- Medical records, including physicians written opinions for the duration of the employee's employment plus 30 years.
- Training records for one year beyond the last date of employment.

4.0 NOISE

Construction workers are among the most affected by industrial noise. The types of workers at risk include:

- Users of impact equipment and tools (eg piling hammers, concrete breakers, manual hammers).
- Users of explosives (eg blasting, cartridge tools).
- Users of pneumatically powered equipment.
- Operators of plant powered by internal combustion engines.
- Bystanders in the vicinity of the plant.
- Operators and bystanders in enclosed spaces where there are noisy activities or a concentration of plant.
- Service and equipment maintenance personnel.

It is very important for CON TECH to adopt a preventive management program aimed at the reduction of workers' noise exposures. The best ways to achieve this reduction are to employ quiet work practices (like quiet piling systems) and use quiet construction equipment (like silenced compressors). When quieter alternatives are not available, consideration will be given to a site layout to arrange noisy processes away from workers not involved in their operation. Portable barriers can be used around static equipment like generators and concrete pumps.

To achieve better results, noise control aspects will be included in all four stages of any construction project: client's specifications, tenderer's proposal, site planning and construction phase.

Client's Specifications

A client should include noise control requirements for both occupational and environmental noise early in the planning stage for a new project. The desired noise control requirements may be included in a client specification list. This can help to avoid unexpected and often very expensive noise control during the construction phase. It allows us to plan how to overcome noise problems in advance.

The client's specifications may include the following categories:

Specified noise exposure levels during the construction phase, as per legislative requirements or company policy

- Use of quiet/ silenced equipment
- Adoption of quiet alternative techniques
- Use of noise control measures like silencers, barriers, enclosures
- Erection of warning signs identifying noise hazard areas
- Time restrictions
- Provision of personal hearing protectors and training

YOUR COMPANY PLAN

Following the client's specifications, YOUR COMPANY PLANS should cover all the specified categories and formulate a noise control policy and a noise control plan to be included in the site specific safety management plan.

The noise control plan may be a set of actions required to achieve the noise control policy and to reduce noise exposure. It may also include information on how YOUR COMPANY is planning to meet its obligations, like:

- List of equipment to be used - with noise levels at operator position and/or at 1 m.
- Methods undertaken to lower noise exposure, eg maintenance, barriers, enclosures.
- Restricted hours, rotation of workers in noisy places, special time arrangements like noisy work done after hours.
- Identification of noisy equipment and processes by signs.
- Site induction for employees and contractors to include noise levels, noise controls and correct use and maintenance of personal hearing protectors.
- Selection and provision of appropriate personal hearing protectors.
- Audiometric tests.

Planning of site activities

The main contractor should plan to coordinate subcontractors so that the activities of one do not unnecessarily expose employees of another to noise hazards. It is good practice to nominate one person as the noise coordinator for all noisy activities. Site planning should include:

- Preparation of guidance to workers on noise hazards and measures to be taken to reduce noise exposure.
- Preparation of schedules of noisy plant and exposure estimates for each phase of work.
- Laying out the site to separate noisy activities from quieter ones, eg concentrate compressors, pumps and generators in screened-off areas or away from the work to be carried out; workshops, stores etc away from noisy activities.

- Scheduling noisy activities to take place when the minimum number of other nearby workers are present (but noise out of hours needs to be carefully planned to avoid neighbourhood annoyance).
- Rostering workers to minimise exposure times.
- Ensuring that workers are well trained, instructed and supervised in noise matters and responsibilities including correct use and maintenance of personal hearing protectors.

Construction Phase

Once the construction work is in progress, it is essential to monitor the implementation of the noise control plan. This could be carried out by the client or the main contractor and could include the following:

- Checking if equipment brought onto site complies with specifications. This could be done by obtaining information available from suppliers or by noise assessments.
- Reducing noise from identified noise sources by exchanging equipment and/or processes for a quieter alternative or by engineering control methods to quieten the existing one.
- Ensuring that all plant is properly maintained eg all noise control measures like silencers and enclosures are intact.
- Monitoring work schedules to check that noisy work is carried out as specified, away from other workers, outside hours, etc.
- Monitoring if noisy areas are identified and well marked so employees and contractors can avoid entering them unnecessarily.
- Monitoring whether training and hearing tests have been carried out and if personal hearing protectors are adequate and are being worn and maintained correctly.
- Ensuring that the cause of any hearing loss shown up by audiometry is investigated.
- Utilising safety toolbox meetings to provide feedback on effectiveness of noise control measures and personal hearing protectors to employees and employers.
- Posting on safety notice boards results of noise assessments conducted and additional noise information.

APPENDICES

CHECKLIST FOR SILICA EXPOSURE

CHECKLIST FOR EMPLOYEE EXPOSURE MONITORING

1. Is there silica in the workplace that can be released into the workplace air? Yes___ No___

2. If "yes", have you made a written determination that states whether any employee may be exposed to airborne concentrations of silica? Yes___ No___

3. If "yes" to 2, does the written determination include at least the following:
 - a. Any information, observations, or calculations that would indicate employee exposure? Yes___ No___
 - b. If employees are exposed to toxic material, statement that exposure is at or above the Permissible Exposure Limit for crystalline quartz? Yes___ No___
 - c. Any employee complaints of symptoms attributable to exposures? If "yes", go to [symptoms list](#). Yes___ No___
 - d. Date of determination, work being performed, location within the worksite, identification of employees possibly exposed? Yes___ No___
 - e. Any concentration measurements (area or personal) taken? Yes___ No___
 - f. Any comments from medical examinations that may point to possible exposures? Yes___ No___

4. Is there any reasonable possibility of any employee being exposed above the Permissible Exposure Limit according to the written determination? Yes___ No___

5. If "yes", have you measured the exposure of the employee (s) most likely to have the greatest exposure (maximum risk employees)? Yes___ No___

6. If "no", have you repeated Step 2 and succeeding steps each time there has been a change in production, process, or control measures that could result in an increase in airborne concentrations of any material in Step 2? Yes___ No___

7. If any exposure measurement indicates exposure above the Permissible Exposure Limit, have you:
- a. Identified all employees so exposed? Yes___ No___
 - b. Sampled those employees so identified? Yes___ No___
 - c. Classified all employees according to noncompliance exposure, possible overexposure, or compliance exposure? Yes___ No___
8. Have you taken the following actions, depending on employee classification:
- a. Resampled employees with noncompliance exposures within 1 month and decided whether controls are to be instituted? Yes___ No___
 - b. Resampled employees with possible overexposures within 2 months and reclassified them if appropriate? Yes___ No___
 - c. Resampled employees with compliance exposures every 2 months (or if changes occurred in the operation) and reclassified them if appropriate? Yes___ No___
9. Have employees with exposures exceeding Federal standards been informed? Yes___ No___
10. Have all employee exposure measurements been properly recorded and filed? Yes___ No___
11. Have you instituted appropriate controls for those exposed employees needing them? Yes___ No___

CHECKLIST FOR ASBESTOS MONITORING

ASBESTOS SELF INSPECTION CHECKLIST

Name of Business:

Date of Inspection:

Area Inspected:

Signature of Inspector:

1. Have you identified the presence, location, and quantity of all asbestos-containing materials in the work place? [[1910.1001\(j\)](#)]

2. Have employees been informed of all asbestos-containing materials in their respective work areas? [[1910.1001\(j\)](#)]

3. Have identifying signs and labels been attached or posted so all employees know to avoid these materials? [[1910.1001\(j\)\(3\)](#)]

4. Are all materials suspected of containing asbestos in facilities constructed before 1981 handled as if they do contain asbestos until proven otherwise? [[1910.1001\(j\)\(1\)](#)]

5. Have employees and contract employers and their employees (including housekeeping personnel) received initial awareness or worker training as well as annual refresher training appropriate to their work assignments and is the training material available for employees and regulators to inspect? [[1910.1001\(j\)](#)]
-
-
-
6. Are regulated areas established and demarcated, and is access restricted appropriately? [[1910.1001\(e\)\(1\)](#), [\(e\)\(2\)](#), and [\(e\)\(3\)](#)]
-
-
-
7. Is drinking, smoking, chewing gum or tobacco, and application of cosmetics prohibited in the regulated area? [[1910.1001\(e\)\(5\)](#)]
-
-
-
8. Is smoking prohibited in all work areas? [[1910.1001\(e\)\(5\)](#), [\(i\)\(4\)](#)]
-
-
-
9. Is a written respiratory protection program and a medical surveillance program in effect? [[1910.1001\(f\)\(2\)\(i\)](#), [\(l\)\(1\)\(i\)](#)]
-
-
-
10. Are workers provided with protective work clothing and equipment appropriate to the work assignment, and are workers provided with clean clothing and equipment at least weekly? [[1910.1001\(h\)\(3\)\(i\)](#)]
11. Are workers provided with a clean room and shower facilities appropriate to the work being performed, and is the change room separated from the storage area where potentially contaminated clothing and equipment are kept? [[1910.1001\(i\)](#)]
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-
-
12. Is all potentially asbestos-contaminated clothing that needs to be laundered containerized, labeled, handled, and transported appropriately and is anyone handling or laundering it fully informed of the potential hazards? [[1910.1001\(h\)\(2\)\(iv\)](#), [\(h\)\(3\)\(v\)](#)]
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-
-

13. Is a positive-pressure, air-filtered lunchroom provided, and are employees required to wash their hands and face before eating and smoking? [[1910.1001\(i\)\(3\)\(ii\)](#)]

14. Is employee exposure to asbestos over 0.1 fibers per cubic centimeter (f/cc) of air on an 8-hour, time-weighted average (TWA) prevented? [[1910.1001\(c\)\(1\)](#)]

15. Is employee exposure to asbestos over 1.0 f/cc for a 30 minute excursion limit (EL) prevented? [[1910.1001\(c\)\(2\)](#)]

16. Is employee exposure over 0.5 f/cc TWA and 2.5 f/cc EL prevented in the following job descriptions? [[1910.1001\(f\)\(1\)\(iii\)](#)]

- Coupling cutoff in primary asbestos-cement pipe manufacturing
- Sanding in primary and secondary asbestos-cement sheet manufacturing
- Grinding in primary and secondary friction product manufacturing
- Carding and spinning in dry textile processes
- Grinding and sanding in primary plastics manufacturing

17. Are representative employees monitored for TWA and EL at least every 6 months? [[1910.1001\(d\)\(3\)](#)]

18. Is a written program to reduce employee exposure below the TWA and EL in place, and is the program reviewed and updated as necessary? [[1910.1001\(f\)\(2\)\(i\)](#)]

19. Is asbestos handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to reduce employee exposure below the TWA and EL? [[1910.1001\(f\)\(1\)\(vi\)](#)]

20. Are engineering controls used to reduce employee asbestos exposure to the lowest achievable levels and is local exhaust ventilation designed, constructed, installed, and maintained in accordance with ANSI Z9.2-1979? [[1910.1001\(f\)\(1\)\(iv\)](#)]

21. Are all hand-operated and machine-operated tools that could produce or release asbestos fibers equipped with local exhaust ventilation? [[1910.1001\(f\)\(1\)\(v\)](#)]

22. Are respirators used during installation or implementation of: [[1910.1001\(g\)\(1\)](#)] [[1910.134](#)]

- engineering and work practice controls,
- work such as maintenance and repair activities where engineering and work practice controls are infeasible,
- all operations where engineering and work practice controls are not yet sufficient to reduce exposures below the TWA and EL, and
- during emergencies?

23. Are appropriate respirators used in regulated areas? [[1910.1001\(e\)\(4\)](#)]

24. Are asbestos-containing cements, mortars, coatings, grouts, plaster, and similar materials removed from containers while either wet, ventilated, or enclosed? [[1910.1001\(f\)\(1\)\(viii\)](#)]

25. Is using compressed air to remove asbestos prohibited unless it is done in a containment that will capture all dust? [[1910.1001\(f\)\(1\)\(ix\)](#)]

26. Is sanding of asbestos-containing flooring prohibited? [[1910.1001\(f\)\(1\)\(x\)](#)]
