Asbestos Standard – Quick Tips

Asbestos is a naturally occurring mineral that’s been known to man for centuries. The ancient Greeks initially spun it into a cloth-like material. During the Industrial Revolution, manufacturers used asbestos for its structural strength and insulating properties.

The popularity of asbestos escalated during the early to mid-20th century. By the 1930s, asbestos was known as the “miracle mineral,” and it was used in everything from insulation and fire walls to Christmas tree ornamentation. As the century progressed, sprayed asbestos fireproofing materials were incorporated into new building construction. It’s estimated that half of the multi-story buildings constructed during the 1950s to the 1970s contain some form of sprayed asbestos.

During the late 1960s, evidence began to emerge that removed some of the luster from this miracle mineral. Studies were indicating that asbestos presented a health risk. By the 1970s, the federal government began to regulate asbestos, and the Occupational Safety and Health Administration’s (OSHA’s) asbestos standard, 29 Code of Federal Regulations (CFR) 1910.1001, was published June 20, 1986.

With the information now available concerning the dangers associated with asbestos, it’s vital for those potentially exposed to it to have an awareness of the health hazards it presents. Knowledge of air monitoring methods and appropriate personal protective equipment (PPE) is also important for employees working with asbestos.

Health Hazards

The human respiratory system has basic mechanisms to filter the air we breathe. However, even with our natural defenses at work, some particulate material does pass through and reach the lung wall. Once attached to the lung wall, most particles are attacked and destroyed by large cells called macrophages. Because asbestos is a mineral fiber, the macrophages are unable to attack it and remove it from the lung. The macrophages deposit a coating on the asbestos fiber and scar tissue begins to form around it.

Three diseases are associated with asbestos exposure: asbestosis, lung cancer and mesothelioma. Asbestosis is characterized by fibrotic scarring of the lung.

It’s a restrictive lung disease that reduces lung capacity. Asbestosis is prevalent among workers who have been exposed to large doses of asbestos over a long period of time. Studies indicate that employees exposed to industrial concentrations of asbestos have an increased risk of lung cancer. This risk is compounded for smokers who work with asbestos. Mesothelioma is a cancer of the chest cavity lining and is the rarest of the three asbestos-related diseases.

It’s important to note that the studies that have documented the hazards of asbestos were conducted with asbestos workers and laboratory animals. Risks associated with low-level, non-occupational exposures are not well established.

In terms of how much asbestos is too much, OSHA has established an eight-hour time-weighted average (TWA) permissible exposure limit (PEL) for employees of 0.1 fiber per cubic centimeter (f/cc) of air. The agency also established a 30-minute excursion limit of 1.0 f/cc. The excursion limit is essentially a short-term exposure limit. Employees cannot be exposed to concentrations of asbestos exceeding 1 f/cc averaged over a 30-minute sampling period.

Employers with staff exposed to levels exceeding these limits need to implement engineering controls or work practices to help reduce exposure levels below established limits. If these controls are not feasible or can’t by themselves reduce the exposures to acceptable levels, then respiratory protection, protective clothing and other PPE must be used.

Monitoring for Asbestos

Appendix A in OSHA’s asbestos standard identifies the mandatory protocol for conducting asbestos air monitoring. A continuous flow pump capable of delivering a flow rate of between 0.5 and 2.5 liters per minute is required. The sampling medium must be a mixed cellulose ester filter membrane, designated by the manufacturer as suitable for asbestos counting. The asbestos standard also states, “The preferred collection device shall be the 25-millimeter (mm) diameter cassette with an open-faced 50-mm electrically conductive extension cowl. The 37-mm cassette may be used if necessary but only if written justification for the need to use the 37-mm filter cassette accompanies the sample results in the employee’s exposure monitoring record.”

Once the samples are collected, they must be analyzed and the asbestos particles physically counted by an analytical laboratory. The protocol the laboratory must follow is also detailed in Appendix A.

Respiratory Protection and PPE

Should the results of the monitoring determine that the exposure limits are being exceeded, the employer must implement engineering controls or work practices to reduce the exposure to acceptable levels. Improved ventilation or reductions of the amount of dust created are examples of these control measures.

From an OSHA perspective, respiratory protection is the last option to reduce asbestos exposure. See 29 CFR 1910.1001(g) and Quick Tips #330: Respirator Selection Requirements of Substance-Specific Standards for more information.

The “high-efficiency filters” identified in 1910.1001(g)(3)(ii) were for many years known as High-Efficiency Particulate Absolute (HEPA) filters. With the adoption of the National Institute for Occupational Safety and Health’s

(NIOSH's) 42 CFR 84 standard for particulate filters, 100 class filters became the standard non-powered air-purifying element for asbestos. However, per 1910.1001(g)(3)(i), OSHA excludes any type of filtering face piece (disposable) respirator from protection against asbestos fibers.

Under 29 CFR 1910.1001(h), OSHA identifies protective clothing and equipment. Protective clothing is necessary to keep asbestos fibers from contacting the body, as well as to prevent the contamination of an employee's street clothes. Contaminated street clothing presents an obvious concern because asbestos fibers can be transported on the clothing from the work site to the employee's home.

In terms of appropriate PPE, OSHA suggests coveralls, gloves, head coverings, foot coverings, face shields and vented goggles. Tyvek® full-body coveralls with elastic wrists, attached hood and booties, combined with nitrile gloves and American National Standards Institute (ANSI) compliant face shield and goggles are specific examples of the PPE OSHA suggests. Other PPE such as hard hats and steel-toed footwear may also be necessary depending upon the job function.

Hazard Communication

Under 29 CFR 1910.1001(j), OSHA requires the hazards of asbestos be communicated to the affected employees. This is accomplished by:

- Posting signs in each regulated area as well as all approaches to the regulated area
- Labeling all raw materials, mixtures, scrap, waste, debris and other products containing asbestos fibers, or their containers
- Employee training prior to or at the time of initial assignment and at least annually thereafter

On March 26, 2012, OSHA revised its Hazard Communication standard 29 CFR 1910.1200 (with an effective date of 60 days thereafter). One of the most significant changes in this revision was OSHA's adoption of portions of the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). As a result, the wording on the asbestos signs and labels was altered to reflect language consistent with GHS.

Signs – 1910.1001(j)(4)

Post June 1, 2016
DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

In addition, where the use of respirators and protective clothing is required in the regulated area, the warning signs must include the following:

WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING
IN THIS AREA

Prior to June 1, 2016
DANGER
ASBESTOS

CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

In addition, where the use of respirators and protective clothing is required in the regulated area, the warning signs must include the following:

RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

Labels – 1910.1001(j)(5)

Post June 1, 2015
DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

Prior June 1, 2015

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

Signs may be posted in lieu of labels as long as they contain the information required for labeling.

Sources

Asbestos, 29 CFR 1910.1001, Occupational Safety and Health Administration, 2006

Asbestos Abatement Regulations, 40 CFR Part 763, Environmental Protection Agency

OSHA Fact Sheet Asbestos, 3507, Occupational Safety and Health Administration, 2014

History of Asbestos Use, Mesothelioma Cancer Alliance, 2015

Mesothelioma & Asbestos Cancer Resource Center