

INDUSTRIAL RELATIONS BULLETIN

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SUBJECT ASBESTOS	SUPERSEDES Same	DATED 10/14/86	

Asbestos is a variety of natural fibrous, incombustible silicate minerals which are linked to asbestosis, a progressive lung-scarring disease, and to cancer of the lungs and other organs. The hazard of asbestos is linked to the inhalation of many small airborne fibers of this chemically stable mineral which cannot be metabolized. The health hazard increases as number of inhaled fibers increases (concentration of fibers in inhaled air x length of exposures x number of times exposures have occurred = inhaled dose; i.e., increased dose = increased risk).

Six fibrous minerals, all silicates, are recognized as asbestos: chrysotile (white asbestos), amosite (brown asbestos), crocidolite (blue asbestos), actinolite, anthophyllite, and tremolite. The first three are the most important members of the group with chrysotile representing approximately 90% of world production. Actinolite, anthophyllite, and tremolite are much less commonly used, but possible occurrence as airborne contamination must not be overlooked.

Asbestos has about 3000 different uses with approximately two-thirds used in construction industry in building products, insulation, friction materials, and textiles. Manufactured products include reinforced asbestos cement and pipes; wall sheathing; asbestos rope insulation; patching and taping compounds; floor and ceiling tiles; paints, coatings, and sealants which contain reinforcing asbestos fillers; pipe linings; and fillers for various liquids. Friction products include brake linings and clutch facings. A variety of other uses are known including theater curtains, fire blankets, flameproof and heat-insulative clothing, filtration materials, contaminants in industrial talc, and until only recently, dry wall patch-spackling compounds and imitation fireplace ashes. Asbestos may be incorporated into thermoplastic sealers and adhesive fillers.

Once incorporated into manufactured items, asbestos hazards are less probable as long as the substance is not disrupted. However, asbestos fibers are nearly indestructible, and a potential health risk arises whenever fibers are set free resulting in airborne asbestos dust. For example, "Transite" wall sheathing is an asbestos hazard with minimal risks as long as it is undisturbed, but when a carpenter cuts the material dry with a circular saw and with poor ventilation, the inhalation health hazard risk becomes substantial.

OSHA has regulated exposures to asbestos fibers since 1972. The exposure limit has been reduced from two million particles per cubic foot of air to 12 fibers per cubic centimeter of air (f/cc) to 5 f/cc, then to 2 f/cc, and now 0.1 f/cc. The PEL includes an excursion limit of 1.0 f/cc, averaged over 30 minutes. OSHA asbestos standard regulations are covered by 29 CFR 1910.1001 for general industry and 29 CFR 1926.58 for the construction industry. Asbestos exposures in Ontario are regulated under the Occupational Health and Safety Act (Revised Statutes of Ontario, 1980, Chapter 321, August 1982). Exposure limits differ under the OSHA and OHSR regulations; however, industrial hygiene work practices to control asbestos fiber and dust exposures are the same.

Asbestos Health Hazards

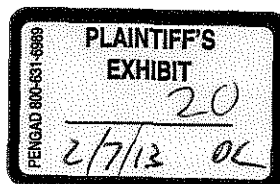
Asbestos can cause asbestosis, cancer of the lungs and digestive tract, and mesothelioma.

Asbestosis is a diffuse, fibrotic lung disease caused by the inhalation of high concentrations of asbestos fibers usually after many years of dust exposures. The onset of asbestosis depends upon concentrations of inhaled asbestos fibers and dust, fiber shapes, type of asbestos, and length of exposure. The disease usually does not become evident until approximately ten or more years after the first exposure to asbestos. Once established, asbestosis typically progresses even after exposures cease.

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Bronchogenic carcinoma (lung cancer) and mesothelioma of the peritoneum and pleura (cancer of membranous lining of abdominal and chest cavities) are also associated with asbestos inhalation. Excesses of cancer of the larynx, colon, stomach, and rectum have been reported. Some forms of asbestos appear far more carcinogenic than others. As with asbestosis, there is a long latent period of at least five years and typically more than 20 years before cancer may develop.

The mechanism of carcinogenesis is unknown but research suggests that asbestos-induced cancer relates, in part, to fiber shapes and the long residence time of these fibers in body tissues. Asbestos differs from most chemical carcinogens because it is not metabolized. Thus even a limited inhalation of a very high concentration leads to the continued presence of fibers in the lungs which have an ability to migrate to the abdominal cavity and other tissues and organs.

Disease risks from asbestos inhalation have been clearly defined for only a few occupational groups. Firm epidemiological data are available for only heavily exposed workers employed in asbestos mining, manufacturing, and handling. There is some evidence other occupations are also at risk. These include carpenters, electricians, painters, machinists, boilermakers, welders, pipefitters, masons, and possibly brake and clutch mechanics. Cancer risks from asbestos inhalation are further complicated because smokers with asbestos fiber exposures have much greater chances of diseases than non-smoking asbestos workers. Increased risks of asbestos-related diseases in smokers are at least 50-fold over non-smokers.

Potential Asbestos Fiber Exposures

The following materials present a risk of asbestos fiber inhalation if careful work practices are not followed:

- Insulation on steam and hot water lines, boilers, ovens, furnaces, tanks
- Brake and clutch assemblies
- Building sheathing, structural "Transite" wallboards, cooling tower walls
- Insulation and fireproofing sprayed on ceilings, walls, structural steel
- High temperature blankets, gloves, fireproof paper above suspended ceilings
- Gaskets, powder filtration aids, industrial talc, parting compounds

It is prudent to assume these materials contain some asbestos unless laboratory analyses or MATS information indicate otherwise. The health hazards depend on the type and amount of asbestos in the material, ability to crumble and become airborne, concentration in the breathing zone of workers which depends on their work practices, duration of exposure, and frequency of exposures. Exposure can occur during handling, sawing, grinding, milling, drilling, sanding, removing, repairing, or otherwise disturbing asbestos-containing materials. Undisturbed asbestos-containing products are hazards with a very low risk. Risks to health increase as asbestos-containing materials are carelessly handled.

Permissible Exposure Limits (PEL, Breathing Zone Concentrations)

- Eight-hour time-weighted average exposure PEL: 0.1 f/cc for fibers longer than five microns. There is no ceiling concentration.
- Thirty-minute excursion limit: 0.1 f/cc for fibers longer than five microns.
- Ontario TWAE PELs for amosite, crocidolite, and other forms of asbestos are 0.5, 0.2, and 1.0 f/cc >5 μ m, respectively. Respective Ontario ceiling PELs for amosite, crocidolite, and other forms are 2.5, 1.0, and 5.0 f/cc >5 μ m.

Methods of Compliance to Control Exposures

- Engineering controls, such as isolation, enclosure, substitution, general and local exhaust ventilation, and vacuum dust collection, should be used.
- All hand and power-operated tools which could release asbestos dust/fibers in excess of the PEL must be provided with local exhaust ventilation.
- Insofar as feasible, asbestos-containing materials must be handled, applied, mixed, removed, cut, scored, or otherwise be worked in a wet state. The use of water and wet dust suppression methods are very effective in controlling exposures during insulation removal and repair.
- Compressed air shall not be used to remove asbestos unless used in conjunction with a ventilation system designed to capture and exhaust dust clouds.
- Where exposures exceed the PEL, a written program to reduce the exposures by engineering methods, work practices, and permitted respiratory protection is required. The written program shall be forwarded to Industrial Hygiene.
- Compliance with PEL may not be achieved solely by use of respirators, except under special conditions approved by Industrial Hygiene.
- Employees with potential exposures to asbestos shall be trained in safe work practices and informed of the provisions in the OSHA asbestos standards and in these Industrial Hygiene Bulletins.
- Asbestos-containing materials shall not be dry- or wet-sprayed. Employees engaged in demolition or removal of asbestos-containing materials shall be provided and required to wear an appropriate respirator and special protective clothing (coveralls, hood and foot coverings, gloves).
- Only Industrial Hygiene-approved respirators, suitable for the concentration of asbestos expected, are to be provided and worn. A respiratory protection program in accordance with Industrial Hygiene Bulletin 15 is required. In the absence of data on degree of exposure to asbestos fibers, employees must wear a full-face air-supplied respirator and high-efficiency particulate air (HEPA) filter cartridges for exit from regulated areas.

- Employees wearing negative-pressure air-purifying respirators must be fit-tested initially and every six months thereafter.
- Double lockers and special laundering procedures for asbestos-contaminated clothing are required.
- Showers, special change rooms, and lunchroom facilities with positive-pressure and filtered air supply are required for employees whose exposure is in excess of the PEL.
- The OSHA construction standard requires a decontamination room for employees exiting regulated-area, negative-pressure enclosures.

Monitoring

Initial monitoring is required by obtaining personal breathing zone air samples which are representative of full-shift exposures for each shift, each employee, each job class, and each area. Periodic monitoring is required if the initial monitoring shows exposures above the action level. Sampling frequency shall not exceed six months if exposures could exceed the action level. Observations of monitoring shall be provided to employees or their representatives. Monitoring is required when an exposure above the action level is expected.

Employee Notification

Employees must receive a written notification of exposures within 15 days after employer receives monitoring results. If exposure exceeds PEL, the notification must state corrective measures being taken to reduce exposures below the PEL.

Medical Examinations

Employees exposed, or who have been exposed, above the action level must have annual and termination medical examinations which shall include medical history to elicit respiratory impairment, respiratory disease questionnaire completion, pulmonary function testing, chest X-ray, and a complete physical examination.

Recordkeeping

Monitoring and medical records must be retained for 30 years. Employees, their designated representative, and OSHA and NIOSH representatives may, on request, have access to these records.

Written objective data exempting operations from monitoring requirements are to be retained for 30 years. These shall also be available for review as above.

Records of asbestos hazards training shall be retained for one year beyond the employee's termination of employment.



Regulated Areas

For production or small-scale, short-duration operations where exposures could exceed PEL, regulated areas shall be established which clearly mark boundaries of the work area. Access shall be limited to authorized personnel with full protective clothing and appropriate respirators.

For large demolition or removal work where exposures could exceed the PEL, the regulated area established shall be a negative-pressure enclosure supervised by a competent person as defined by the OSHA construction standard below. Negative-pressure enclosures may be temporary structures. Small-scale or short-duration operations do not require a negative-pressure enclosure or the supervision by a competent person.

Competent Person

A "competent person" is one who can recognize asbestos hazards in the workplace and has authority to institute corrective measures to eliminate them. Training must be obtained in a course such as those offered at the EPA Asbestos Training Center or equivalent. His duties would include establishing negative-pressure enclosures, ensuring its integrity, controlling entry and exit, supervising the monitoring, ensuring appropriate use of personal protective equipment, ensuring employees have appropriate training, and ensuring that engineering controls are working properly.

Multi-employer Worksites

The employer conducting asbestos work shall inform other employers of the work being conducted and the hazard controls in place on a multi-employer worksite.

Signs and Labels

Caution signs shall be displayed where exposures could exceed the PEL at such a distance to allow employee to take protective measures before entering asbestos work areas. The sign shall state the following:

DANGER
ASBESTOS
CANCER and LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS and PROTECTIVE CLOTHING ARE REQUIRED in THIS AREA

Labels with the following language shall be clearly affixed to bags containing contaminated work clothing and asbestos scrap and debris:

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

Housekeeping

Surfaces should be kept free of accumulations of asbestos if, with dispersion, there would be airborne asbestos fibers. Asbestos-containing scrap and debris, contaminated clothing, and ventilation system filters and vacuum filters shall be disposed in sealed, labeled, impermeable bags. Asbestos-containing waste is not to be incinerated or discharged into community water supplies.

HEPA-filtered vacuums are required for cleaning. Compressed air shall not be used for cleaning.

Employee Training

Employees shall be trained in asbestos health hazards and educated in the steps to be taken by the employer and themselves to protect their health. Training shall be provided prior to the initial assignment and shall include pertinent information relative to hazards, safe handling, controls, work practices, use of respirators and clothing, and exposure monitoring.

Vacuum Systems

Manufacturers of washers and industrial vacuums equipped with high-efficiency (HEPA) filters acceptable for asbestos brake dust/fibers and general vacuuming of asbestos-contaminated surfaces include:

- Ford "Rounda" Brake Vacuum (Part 34-0009)
- Ford "Rounda" Brake Parts Washer (Part 65-0016)
- "Nilfisk"
Nilfisk of America, Inc.
201 King Manor Drive
King of Prussia, PA 19406
215/277-3900
- "Hako Minuteman"
Hako Minuteman
111 South Route 53
Addison, IL 60101
312/627-6900
- "Tornado ToxVac"
Breuer Electric Manufacturing Co.
7401 West Lawrence Avenue
Chicago, IL 60656
312/867-5100