

ASBESTOS WORKER/SUPERVISOR REFRESHER

**PARTICIPANT'S MANUAL
08.01.05**



**The Center To
Protect
Workers' Rights**



The Center to Protect Workers' Rights

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Asbestos Supervisor Refresher Manual

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ASBESTOS BACKGROUND INFORMATION

Asbestos Facts

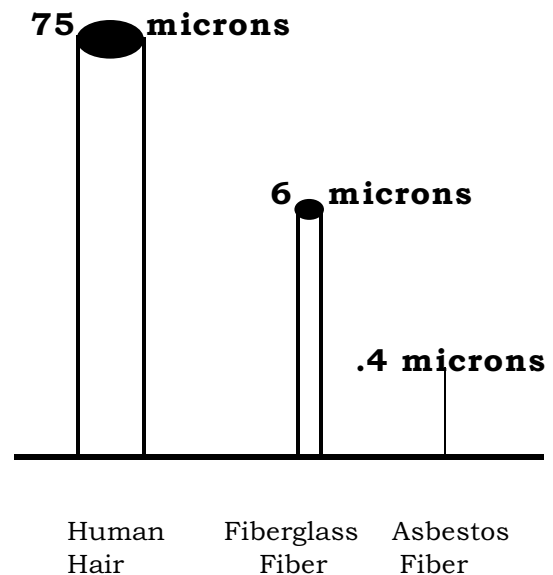
What is Asbestos?

Asbestos is a mineral. **It is a natural rock mined from the ground.** Most of the asbestos used in this country comes from Quebec in Canada. Some of the asbestos used here comes from South Africa. Asbestos is also found in America in the waste materials in many mining operations, and in vermiculite.

If you looked at an asbestos-containing rock it would look "hairy" as if it had cotton sticking out of it. When the rock is crushed, the asbestos fibers are released.

The smallest of these fibers are like thin, sharp, invisible needles.

You cannot feel or taste these asbestos fibers. The fibers that can get into your body are too small to see.



Uses of Asbestos

There are over 3,000 products that contain asbestos. Hardly any products are made of pure asbestos. It is usually mixed with other materials. **Anything that contains more than 1% of asbestos is considered to be an asbestos containing material or ACM.** All ACM is treated like asbestos.

Asbestos is strong, yet it is very flexible. It is a great insulator against heat, cold, and noise. Building materials that are most likely to have asbestos in them are –

- △ fire insulation
- △ heat insulation
- △ floor tiles
- △ ceiling tiles

A lot of asbestos is in old buildings. New buildings built in the 1980's don't have as much asbestos in them.

You are likely to find asbestos in:

- △ Sprayed on ceiling insulation
- △ Pipe and boiler insulation
- △ Duct insulation
- △ Floor and ceiling tile



Sprayed-on asbestos insulation is usually fluffy material sprayed onto ceilings or beams. It was used as soundproofing, fireproofing, or for decorative purposes. Sometimes you can see the insulation. Sometimes it is covered by ceiling tiles or walls. Sprayed on asbestos insulation was banned in 1973.

Asbestos pipe and boiler insulation may be covered with paper, cloth or metal. The insulation may be cardboard-like pipe wrap or cement on pipe elbows. It may also be troweled-on insulation on boilers or boiler wrap.



Some Asbestos-Containing Materials (ACM)		
acoustical (sound) plaster	fire blankets	fireproofing on beams
acoustical (sound) tiles	transite (cement) pipes	flue pipes
boiler insulation	fire curtains	mastic
brake shoes	valves	pipe gaskets
ceiling insulation	fire doors	pipe insulation
chemical tanks	electrical insulation	roofing felts
decorative plaster	spackling	vinyl-asbestos floor tiles
dropped ceiling tiles	siding	
duct insulation	roofing asphalt	transite (cement) sheets

Asbestos duct insulation is usually a thin layer of insulation. It is usually painted to match the room. It may be covered with paper, cloth or metal.



Asbestos floor and ceiling tile look exactly like non-asbestos tile. Asbestos floor tile is usually vinyl asbestos tile (**VAT**). Asbestos floor tile is most often 9 inches square. Asbestos ceiling tile is used for sound insulation or for decorative ceiling tile.

Asbestos is dangerous when it becomes **friable**.

Asbestos is dangerous when it breaks into small fibers and becomes airborne.

Asbestos fibers are very light. Because they are so light and because of their shape they can float in the air for long periods of time. **It can take 48 – 72 hours** for asbestos fibers to fall in a still room. In a room with air currents, these fibers may stay in the air much longer. When the fibers are in the air, they can be breathed in.

"**Friable**" asbestos is an asbestos product that can be crumbled in your hand. It is more dangerous than a non-friable piece of asbestos. The fibers are more likely to get in the air.



An example of friable asbestos is sprayed-on ceiling insulation. The insulation may fall off the ceiling and get in the air without even being touched. When someone touches the ceiling or when air blows across it, asbestos may get in the air.

An example of non-friable asbestos is intact vinyl-asbestos floor tile (VAT). If you leave it alone, the asbestos fibers will probably stay in the tiles. But if you **saw, drill, or sand** the tile, asbestos may get into the air.

Types of Asbestos

There are six different minerals that are all considered to be asbestos. They all cause disease. They are all treated in the same way.

The three most common types of asbestos are:

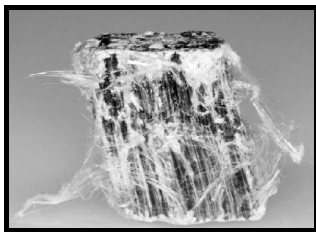
Chrysotile

This is the most common type of asbestos. it makes up **95%** of the asbestos found in buildings. Water is very effective at keeping these fibers out of the air. Chrysotile absorbs 8 times its weight in water. Chrysotile is mined in Quebec, Canada and in Vermont.

This is also called **white asbestos**. Chrysotile is commonly used in spray-on insulation and pipe wraps.

Amosite

This makes up less than **5%** of the asbestos in buildings. It does not absorb water, so it is much harder to control the fibers. Amosite is often found on boilers and mechanical equipment. Amosite is mined in South Africa. This is also called **brown asbestos**. Amosite is used in high moisture areas such as pipes and siding,



Crocidolite

This is very similar to amosite, but is even less common. It is called **blue asbestos**.

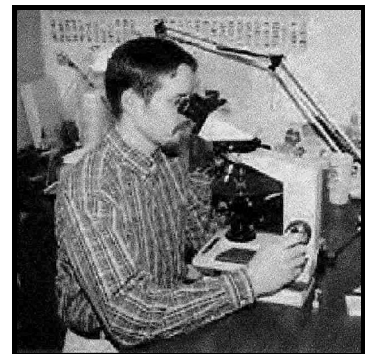
Analyzing Asbestos

You cannot tell if a product contains asbestos just by looking at it. Many products look the same. The only way to be sure is to send a sample to a lab. There are 3 main methods for identifying or measuring asbestos. They are –

Polarized Light Microscopy (PLM) for bulk samples. This method tells whether a bulk sample of a material contains asbestos. Samples are taken through their entire thickness of the material. PLM will tell what type of fiber is present. It will tell what type or types of asbestos are there, if there are other fibers like fiberglass or cellulose and the percentage of each. This method is used for identifying whether and where asbestos in the building and where it is found. Cost for sample analysis is about \$25.00.

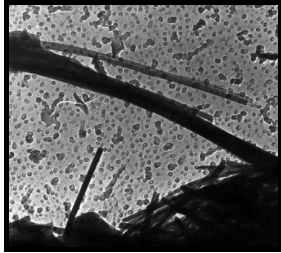
Phase Contrast Microscopy (PCM) for exposure monitoring. This is used for measuring worker exposures to asbestos fibers in the air. It counts all fibers, not just asbestos, and it cannot "see" very small asbestos fibers. OSHA requires air monitoring daily on asbestos jobs for worker exposure.

These samples are collected by attaching a small pump to your waist. A long tube goes



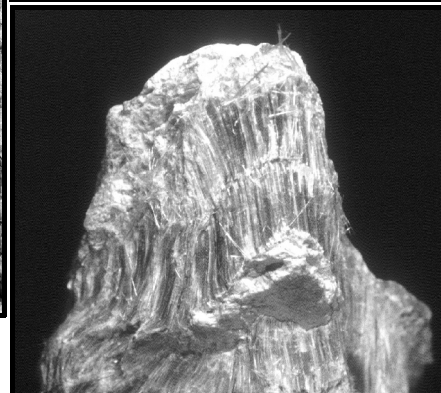
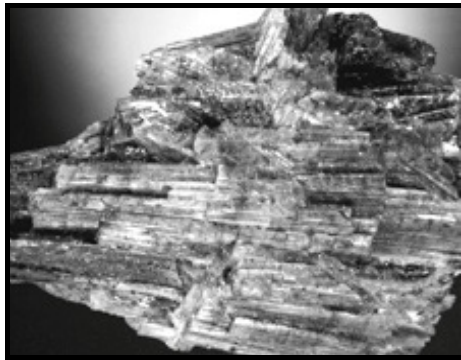
behind your back and connects to an open plastic cassette that is placed face down near your collar (breathing zone). Sample analysis is about \$15.00. See Unit 6.

Transmission Electron Microscopy (TEM) for clearance. This method



uses a very special, very complicated electron microscope that can “see” the very tiny asbestos fibers (see picture at left). It can also tell what type of asbestos fibers are there. This method is good for measuring background and clearance asbestos samples. It is also used when other fibers, such as gypsum or fiberglass, may give a false reading on PCM.

The EPA requires **TEM clearance sampling in schools and public buildings to make sure that areas can be safely re-occupied after an asbestos abatement job is finished.** TEM costs from \$150-350 per sample.



Key Facts

Asbestos is a naturally occurring material that is found in some rock formations.

Asbestos is dangerous when it becomes airborne and can either be swallowed or inhaled.

Older buildings usually have more asbestos in them than newer buildings.

Asbestos was used in a variety of residential and commercial building products including: floor tile; ceiling tile; sound and thermal insulation; siding; roofing; spackling; plaster and stucco; and paints.

Asbestos was used in many industrial settings for the above named products as well as for piping, gaskets, fireproofing, electrical insulation, and brake shoes.

Asbestos that is easily crumbled by hand pressure is called “friable” asbestos.

You cannot tell if a product contains asbestos by looking at it. The sample must be sent to a lab for analysis.

The three most commonly used types of asbestos were:

Chrysotile - White, fluffy asbestos. 95% of all asbestos used in this country was chrysotile asbestos.

Amosite - Brown asbestos. Amosite was used for siding and piping. It does not absorb water easily.

Crocidolite - Crocidolite is a blue/green asbestos. It also does not absorb water readily.

HEALTH EFFECTS

Asbestos can kill you. You must take extra precautions when you work with asbestos. Just because you do not notice any problems while you are working with asbestos, it still may be causing problems that will appear later in life.

Routes of Entry

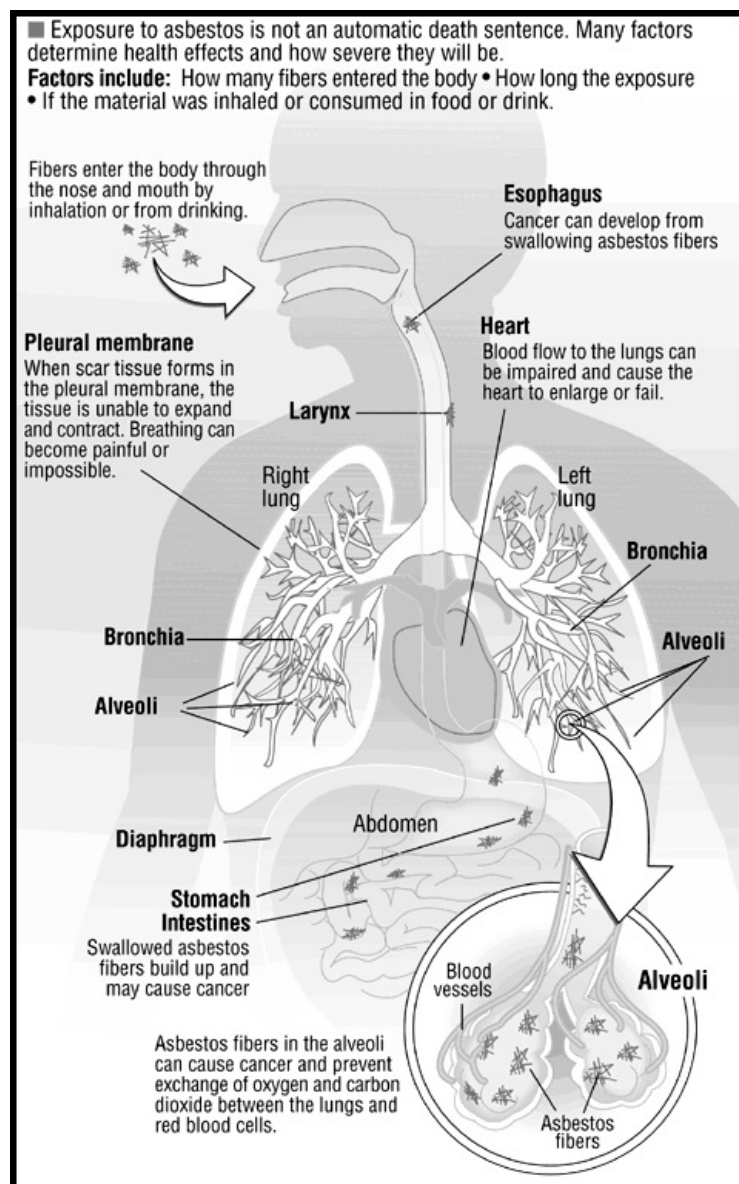
The asbestos fibers that can harm you are too small to see. When these fibers get into the air, they can remain there for days. Airborne fibers can move from the containment area to other parts of the job unless special precautions are taken.

Inhalation

Airborne fibers are very easily inhaled. These fibers are small enough to enter the smallest areas of the lungs. Your body has several natural defense systems to filter the air that you breathe. Asbestos fibers are so small that they can get past the body's natural defenses.

Nasal Hair

The first defense is nasal hair. Some of the larger fibers are trapped here,



but the smaller fibers can get past and enter the breathing passages.

Trachea and Bronchial Tubes

As the air enters the body, it travels down the trachea into the bronchial tubes. The trachea and bronchial tubes are coated with a sticky substance called **mucous**. Larger fibers are trapped in the mucous.

There are tiny, hairlike structures called **cilia** lining these tubes. The cilia are designed to move the mucous up and out of the bronchi where it can be expelled. Smoking can interfere with this process. Unfortunately, much of the mucous is swallowed and enters the digestive system.

Alveoli

The bronchi end in tiny sacs called alveoli. **This is where the air exchange takes place.** The body gives off waste carbon dioxide and takes on oxygen.

Asbestos fibers can damage the alveoli. When the fibers enter the alveoli, they puncture the walls of the alveoli. The body sends **white blood cells** (macrophages) to repair the damage. They cannot destroy the asbestos fibers and eventually die. This causes **scarring** of the walls of the alveoli.

Diseases Caused by Inhaling Asbestos

Asbestosis

This scarring, called **asbestosis**, prevents the exchange of waste carbon dioxide for oxygen. There is **no treatment for asbestosis**. Asbestosis is **a progressive disease**. As more scarring occurs, oxygen exchange is disrupted to the point of causing other health problems. Workers with asbestosis first notice a loss of stamina and tire easily. As the disease progresses, the symptoms become more severe. People with asbestosis usually require supplemental oxygen. They usually suffer from heart problems as a result of lower levels of oxygen in the blood.

Plural Plaques

Plural plaques are small areas of fibrous tissue on the linings of the plural sac that surrounds the lungs. These lesions harden and cause irritation. **This is a very painful condition.** Plural plaques are usually not fatal, but people with plaques face an increased risk of lung cancer.



Healthy Lung

Lung Cancer

People who work with asbestosis and do not use the proper protection are at a higher risk of lung cancer. Cancer is an uncontrolled growth of cells that eventually destroys an organ. Lung cancer symptoms include shortness of breath, constant cough, fatigue, weight loss, coughing up blood, and pain. Treatment includes surgery, chemotherapy, and radiation. **There is a poor cure rate with 9 - 13% living 5 years or more.**



Lung w/ Cancer

Plural Mesothelioma

Plural Mesothelioma is a **rare type** of cancer of the plural sac surrounding the lungs. It is called a “marker disease”.

Mesothelioma is only caused by asbestos. **Most people with mesothelioma die within 6 months to 1 year after detection.** In rare cases (usually extremely early diagnosis), some people have survived 5 years with mesothelioma. There is **no cure** for mesothelioma. Treatment is maintenance drugs to reduce pain.

Ingestion

Asbestos can also enter the body by **ingestion, or swallowing.** Asbestos fibers that are expelled from the respiratory system are swallowed with the mucous. They are also swallowed if they come in contact with the food and liquids that workers drink. This is why you are not allowed to eat or drink in contaminated areas.

If you do not decontaminate properly when you leave the work area, you bring asbestos with you. If you eat or drink without properly decontaminating, some of the asbestos will get on the food and you will

swallow it. If the work area is not contained properly, the asbestos will spread to other parts of the job and you will be exposed.

Asbestos is not absorbed into the blood the way other nutrients are from the digestive system. The fibers penetrate the linings of the stomach and intestines.

Diseases Caused by Swallowing Asbestos

Digestive System Cancers

Cancers of the mouth, esophagus, stomach, and the small and large intestine have all been linked to asbestos exposure. If the cancer is found early, it is relatively easy to treat.

Some of the early signs of digestive system cancers are: change in bowel patterns; blood in the stool; unexplained weight loss; and fatigue.

Peritoneal Mesothelioma

Peritoneal mesothelioma is similar to plural mesothelioma. It is also a “marker disease”. It is only caused by exposure to asbestos. Peritoneal Mesothelioma is characterized by weight loss, severe abdominal pain, and a swollen abdomen. There is no cure for peritoneal mesothelioma. Treatment is maintenance drugs to reduce pain.

How Long Does Take to Get Sick From Asbestosis?

All asbestos diseases have a Latency Period. The latency period is the time between exposure and the time that symptoms become noticeable.

The latency period for asbestos diseases is between ten and forty years. Even if you have not worked with asbestos for many years, it can still cause problems.

Children who are exposed to asbestos seem to suffer the effects much sooner than adults. This is because their bodies are developing much faster. Children may show symptoms in as little as five years. The

asbestos related disease may progress much faster than it would in an adult.

Not everyone who is exposed to asbestos will get an asbestos-related disease, but anyone who is exposed has a greater risk of getting an asbestos disease. All of the asbestos diseases are difficult to treat, and most are impossible to cure. The best thing to do is prevent them.

How Much Asbestos Does It Take To Affect Someone?

Most asbestos diseases are “Dose Related”. This means that **the higher the dose, or exposure, the greater the risk**. The one disease that is not dose related is mesothelioma. Even very small amounts of asbestos can cause mesothelioma.

Who Is At Risk From Asbestos?

People who work with asbestos have a greater risk of getting an asbestos related disease. They are more likely to suffer from asbestos related problems than the general population.

Families of people who work with asbestos are also at a greater risk. If the worker does not decontaminate properly, they will take asbestos home with them. Spouses and children have been exposed to asbestos from a worker’s contaminated clothing. Proper decontamination is vital to your family’s safety.

Smoking and Asbestos Diseases

Workers who smoke are at a greater risk of getting an asbestos-related disease than non-smokers. Smoking affects the cilia in the bronchial tubes. **One cigarette can paralyze the cilia for up to eight hours**. If the cilia are not working properly, they cannot remove the mucous that has trapped the asbestos fibers. Over time, smoking can destroy the cilia, thus removing an important defense mechanism.

If you work with asbestos and smoke, get help to stop smoking. There are several organizations that offer assistance in stopping smoking. Contact them for help.

KEY FACTS

Asbestos can make you sick or even kill you.

Without proper protection, asbestos can enter your body. You do not know it is there. You cannot see it. You cannot smell it. You must take special precautions when working with asbestos.

Asbestos can cause four types of disease:

- **Asbestosis - Often called “White Lung”. Asbestosis is a scarring of the lung that interferes with air exchange in the alveoli.**
- **Mesothelioma - A “Marker Disease” that is only caused by exposure to asbestos. It is a rare type of cancer but is always fatal.**
- **Lung Cancer - Lung cancer is the biggest killer of asbestos workers. It is aggravated by smoking. Asbestos workers who smoke are 80 times more likely to get lung cancer as the general population.**
- **Other Cancers - Cancers of the digestive system**

Dose-Related - The more asbestos fibers you breathe or swallow, the more likely you are to get an asbestos related disease. The exception is mesothelioma.

Latency Period - All asbestos diseases have a latency period. The latency period is the time between exposure and when you become sick. The typical latency period for asbestos related diseases is from 10 to 40 years. The exception is children who may suffer the effects of exposure much sooner.

MEDICAL SURVEILLANCE

If you are going to work with asbestos, you must have special medical exams. These exams are required by law, and must be done by a medical doctor who specializes in occupational medicine. Occupational diseases are diseases that are caused by your job. **Asbestos diseases are occupational diseases.**

Before Employment

If you work with asbestos, you must have a special kind of medical exam before you start work. This is called a **baseline** exam.

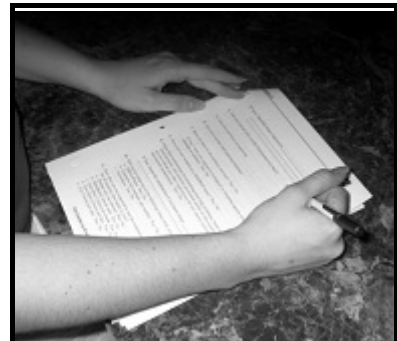
The baseline will be the first exam that you will receive. It is a long and complete exam that looks for any medical condition that may be made worse by asbestos exposure. This exam is for your protection.

Some conditions that may get worse with asbestos exposure include: asthma; lung cancer; digestive system cancers; heart conditions; and high blood pressure.

Required Parts of Baseline Medical Exams

Medical Questionnaire

The questionnaire takes a detailed work and medical history. This questionnaire is found in Appendix D of the Asbestos Standard. It may not be substituted by any other questionnaire. It will aid in revealing any pre-existing medical conditions.



Physical Exam

The physical will concentrate on the organs of the body that are affected by asbestos, such as the lungs, heart, and digestive system. Any conditions that may be made worse by asbestos exposure will be discussed.

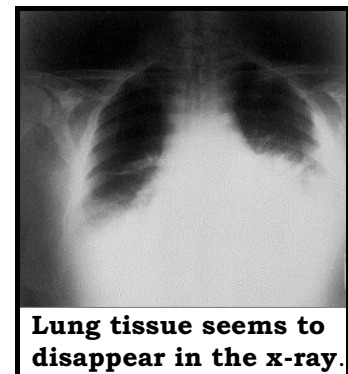
Pulmonary Function Test

A Pulmonary Function Test is a special test that will show **how well your lungs are working**. It can be used for comparison in later exams to see if there are any problems with your lungs. The Pulmonary Function Test often gives the first clue that the lungs are suffering some sort of damage.

Recommended Parts of the Medical Exam

Lung X-Ray

The doctor may decide to do a lung x-ray to make sure that there is no damage to your lungs before you begin work. The x-ray must be checked by a doctor who is trained in reading x-rays related to occupational lung diseases. They are called **B-Readers**. B-Readers have special training and certification in asbestos related lung x-rays.



EKG (electrocardiogram)

An EKG measures the function of the **heart**. Anyone over 40 years of age should have an EKG as a part of an asbestos-related exam.

Sputum Cytology

Sputum Cytology is an analysis of your **mucous**. You cough up some mucous and it is examined for **blood or abnormal cells** that may warn of **cancer**.

Hemoccult Slide

This test checks for **blood or abnormal cells** in your stool. This may be an early warning of a **digestive system cancer**.

Yearly Exams

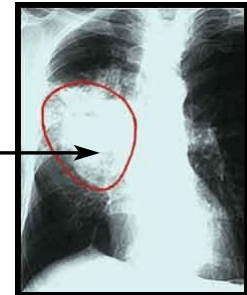
If you continue to work with asbestos, you are required to get a **medical exam every year**. The yearly exams are similar to the baseline exam. They also use a questionnaire. This questionnaire is not nearly as long. It deals with any problems that you may have had in the past year or with any noticeable changes in your health.

The yearly exam **will** include:

- ☒ A full physical exam with emphasis on the lungs, heart, and digestive system.
- ☒ A Pulmonary Function Test.

The yearly exam **may** include:

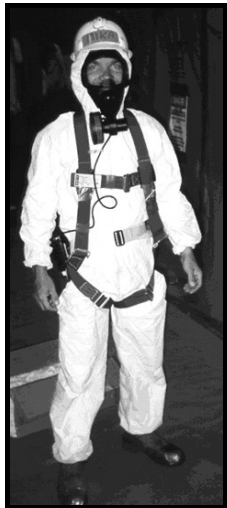
- Chest X-Ray.
- EKG.
- Sputum Cytology.
- Hemoccult Slide.



Cancer

Respirator Physical Evaluation

In addition to the Medical Surveillance required for working with asbestos, you will also need an exam for wearing a respirator. This is a special exam that evaluates your ability to work while wearing a respirator.



Anyone who wears a respirator must be medically evaluated before wearing a respirator. The exam is repeated every year. The exam consists of a questionnaire. Any response out of the ordinary requires a followup medical exam.

The employer must furnish to the doctor a list of any protective clothing that will be worn, the anticipated physical work effort, temperatures and humidity of the work area, and the type and weight of the respirator that will be worn.

After the questionnaire and/or physical exam, the doctor must make a written report on recommendations of the employee to wear a respirator, including any limitations.

Your Medical Exam Results

After your exam, the doctor will write a report and gives a copy to your employer. The report lists any problems that would make it dangerous

for you to work with asbestos. It will also include any medical limitations relating to your work.

Your employer pays for these exams. The employer must inform the doctor of any required and recommended tests for the medical exam. The employer must also inform the doctor not to reveal any findings that do not have a direct connection to your working with asbestos.

You have a right to a copy of the doctor's report. **Your employer must give you a copy within 30 days after getting it from the doctor. Keep this report in a safe place. You may need this report 10 or up to 40 years in the future.**

Medical Records

Your employer must keep your medical records for 30 years after you leave the job. If the employer goes out of business, the records are to be sent to the National Institute of Occupational Safety and Health (NIOSH).

Do not count on your employer being in business when you need your medical records. Even the best run businesses lose records. The longer the records have to be kept, the greater the risk that they will be misplaced. **Request a copy of your medical records when you leave the job.**

Your Part in Medical Surveillance

Protecting your health is a partnership with your employer. There are several things that you as a worker can do to protect your health.

- ✓ **Remember how dangerous asbestos is.** Take all of the required safety precautions. Make sure that you have the right equipment. Make sure that it is working properly. Use the equipment in the proper manner.
- ✓ **Use good work practices.** Work practices are designed to help keep asbestos out of the air.
- ✓ **Quit smoking.** The effects of smoking and asbestos greatly increase

your chances of getting Lung Cancer. There are several organizations to help you quit.

- ✓ **Talk to your doctor.** Inform any doctor you visit that you have worked with asbestos. This will assist the doctor in looking for early signs of health problems associated with asbestos.

- ✓ **Continue getting your medical exams.** It is recommended that you continue with the yearly exams even if you no longer work with asbestos. This is very important if it has been 10 or more years since you have worked with asbestos.

- ✓ **Know the hazards you are working with.** You have a right to know the hazards associated your job. There are many hazards other than asbestos found on abatement jobs. Chemicals that are used to remove some asbestos are very dangerous. Ask about the hazards and take the required precautions.

RECOMMENDED SCHEDULE FOR CHEST X-RAYS			
YEARS SINCE FIRST WORKED WITH ASBESTOS	AGE NOW 18-35	AGE NOW 36-45	AGE NOW OVER 45
0 - TO 10 YRS	EVERY 5 YRS	EVERY 5 YRS	EVERY 5 YRS
MORE THAN 10 YRS	EVERY 5 YRS	EVERY 2 YRS	ONCE A YEAR

Key Facts

Workers must have medical exams before working with asbestos and every year after that.

Medical exams are the quickest way to determine if asbestos is making you sick.

The medical exam includes:

- Long questionnaire
- General physical exam
- Lung tests

Yearly exams include:

- Short questionnaire
- General physical exam
- Lung tests

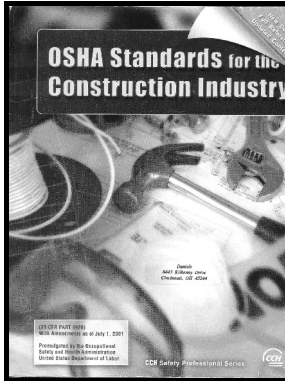
Medical Exams may include:

- Lung X-Rays
- EKG
- Sputum Cytology
- Hemocult Slide

Your employer must give you a copy of the doctor's written opinion within 30 days of receiving it from the doctor.

Your employer must keep your medical records 30 years after your last day on the job.

LEGAL REVIEW & UPDATE



There are lots of laws and regulations designed to protect workers, the general public, and the environment. However, not everyone follows the laws. Many people deliberately break the law. Others simply do not know the requirements.

These laws are for your protection. By knowing and following the laws, you can ensure the safety of the workplace and your community.

The following is a brief summary of the federal laws governing working around asbestos. They list minimum standards of safety. They are not all-inclusive. Be sure to check any applicable state and local laws before working with asbestos.

Exposure Limits

Exposure limits are considered to be safe for the average worker. Keep in mind that everyone is different. Genetic makeup or previous exposures may affect your reactions to certain chemicals.

Exposure limits are listed in several ways. Most chemicals (including asbestos) are listed as a **Time Weighted Average** or TWA. TWAs are usually an average exposure for an 8 hour shift.

The **Permissible Exposure Limit** or PEL for asbestos is **0.1 f/cc** TWA. This means that workers cannot be exposed above 0.1 f/cc averaged over an 8-hour period. (f = fiber; cc = cubic centimeter)

Many times the exposure limit is also listed as an **Excursion Limit**. This is an exposure over a much shorter time. Excursion limits are **usually either 15 or 30 minutes**. The Excursion Limit for asbestos is **1 f/cc over 30 minutes**. This means that no worker can be exposed above 1 f/cc for more than 30 minutes in any 8 hour period.

PEL of 0.1 f/cc

cc = cubic centimeter

1cc = size of one sugar cube

1000 cc per 1 liter of air

0.1 f/cc x 1000cc = 100 fibers per liter of air

We breathe an average of 30 liters of air per minute.

30 lpm x 100 fibers = 3000 fibers per minute

60 minutes x 3000 fibers = 180,000 fibers per hour

Regulated Areas

Asbestos work is divided into four categories:

- △ **Class I** asbestos work is the removal of thermal/sound insulation and surfacing ACM. It is usually considered demolition work.
- △ **Class II** is removal of non-friable asbestos. Sheet goods, floor tile, siding, and mastics fall in this category.
- △ **Class III** is repair work where the asbestos is likely to be disturbed.
- △ **Class IV** is maintenance or custodial work where the asbestos is **not likely** to be disturbed.

For any Class I, II, or III work, a **regulated area** must be established.

- △ The area must be **marked or roped off** to prevent unauthorized

- people from going in.
- △ Anyone who enters must wear a respirator and protective clothing whenever a **negative exposure assessment (NEA)** has not been conducted.
 - △ **No eating, drinking, smoking, chewing gum or putting on make-up is allowed.**
 - △ Whenever there has been no NEA, **negative pressure enclosures** must be set up unless it is absolutely impossible.
 - △ A "**competent person**" must be on site at all times. The competent person must have an EPA-approved asbestos supervisor course. He or she is responsible for making sure all regulations are being followed and all safety and health precautions are taken.

NOTE: Enclosures and a competent person are not required for small-scale, short duration jobs, such as pipe repair, installing or removing drywall, and building maintenance.

Monitoring



Employers are required to perform monitoring to determine the airborne concentrations of asbestos to which an employee may be exposed. A small battery operated **personal sampling pump** is worn by one or more workers in the work area.

Employee exposures must be taken in the employee's **breathing zone**. This is an area within **12"** of the nose and mouth from the ears forward. The sample is collected in a special black "cyclone" cartridge and sent to a lab for analysis.

This sample is used to determine what protective equipment is needed. The sample is called a **representative sample**. This means that the data collected from this sample can be applied to several workers, as long as they are all doing the same type of work. The sample must be collected from a worker that is doing the work likely to result in the highest exposure. Employees must be protected as if they were working at a higher level of exposure until it is proven that their exposure is lower.

Notification

The employer must give the results of air monitoring to the workers on that job as soon as possible after the results are received. (This usually should mean by the following day.)

- ☒ The results must be given in writing or posted in a central place.
- ☒ Workers or union reps must be allowed to watch the monitoring if they want to.
- ☒ Workers are to be informed of the location and amounts of asbestos.

Keeping Asbestos Out of the Air

Engineering controls and work practices must be used to keep asbestos levels in the air below the PEL and the excursion limit. **Respirators and PPE are not the first choice for protecting workers.** Every effort must be made to lower or eliminate exposures before using PPE.

Methods for lowering or eliminating exposures can include:

- ✓ Negative air machines;
- ✓ Power tools with HEPA exhaust systems;
- ✓ HEPA vacuums;
- ✓ Wet methods; and
- ✓ Prompt clean up of asbestos waste.



Methods that are not allowed are:

- ✗ High-speed abrasive disc saws that do not have a HEPA exhaust

- ✗ Compressed air cleaning
- ✗ Dry sweeping or removal methods
- ✗ Employee rotation to lower exposures

Respirators

Respirators must be worn on all asbestos jobs where the excursion limit or the permissible exposure limit is likely to be reached or exceeded. **Respirators are covered in 29CFR1926.1101 (the Asbestos Standard) and in 29CFR1910.134 (Respiratory Protection).** The following is a listing of the main points of respiratory protection for asbestos.

1. **No disposable dust masks allowed.**
2. The employer must provide a **PAPR** (Powered Air Purifying Respirator) instead of a negative pressure respirator if the worker requests it and if it meets the required protection factor.
3. Workers must be allowed to change their filters whenever it becomes **difficult to breathe.**
4. Workers must be allowed to leave the work area to wash their faces and respirator face pieces whenever their skin becomes irritated from wearing the respirator.
5. The employer must choose the respirator based on air monitoring results and the OSHA respirator table.
6. The employer must have a written respirator protection program.
7. **Employees must be fit-tested at least once every year.**
8. **Qualitative fit-testing** with irritant smoke, Bitrix[®], saccharin, or banana oil can be used with half face, air purifying respirators (APRs), powered air purifying respirators, or with positive pressure respirators
9. **Quantitative fit-testing** must be used with full face APRs. Otherwise, they can only be used in areas approved for half-face APRs.



Powered Air Purifying Respirator (PAPR)

Protective Clothing

Protective clothing must be worn when the PEL or excursion limit might be exceeded.

Protective clothing includes:



- △ Coveralls
- △ Hoods



- △ Gloves
- △ Foot coverings

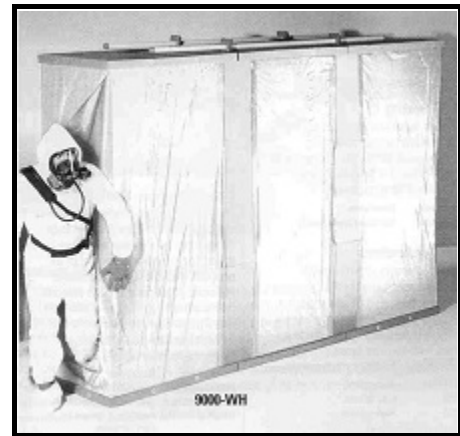


The employers are required to clean the clothing if it is not disposable. Used disposable suits are considered to be asbestos waste. Rips or tears in suits must be taped up immediately or the suit must be replaced.

Hygiene Practices

Decontamination

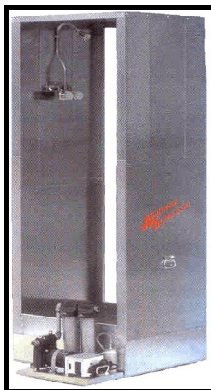
Decons must have at least an equipment room, shower, and clean room. They must be connected to the work area. Workers enter and leave the work area only through the decon.



Showers

Showers must comply with **29 CFR 1910.141(d)(3)**. This means:

- △ One shower for every 10 people (or less) of each sex who are required to shower during the same shift. There must be a separate shower for men and women.



- △ Showers must have hot and cold water with the ability to adjust the temperature of the water.
- △ Clean towels must be provided for each employee.
- △ Soap or other cleaner must be provided.
- △ In addition, the employer shall insure that employees

do not eat, drink, smoke, chew gum or other materials, or apply cosmetics in a contaminated area.

Hazard Communication

As a worker, you have a right to know about the hazards you are working around. You must be told of any asbestos that may be in the areas where you are going to work **[29CFR1926.1101(k)(2)(ii)(B)]**. You also have a right to know about any other chemicals that are being used on the worksite. These rights are listed in the Hazard Communication Standard **(29CFR1926.59)**.

If the building is occupied while work is being done, the occupants of the building also have a right to know about the asbestos hazards.

Paragraph (k) of the Asbestos standard states that:

- △ The building owners must determine the presence, location, and amount of asbestos before work begins.
- △ This information must be communicated to all employers, workers, and tenants of the building.
- △ Regulated areas must be established to limit employee or occupant entry into areas where asbestos is present. Warning signs must be posted.
- △ All potentially exposed employees must be trained to recognize the hazards and protective measures to lessen their exposure.

Medical Surveillance

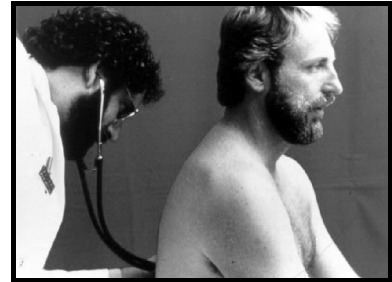
For employees exposed at or above the PEL of asbestos 30 or more days per year, or wear a negative pressure respirator, the employer shall institute a medical surveillance program. This program consists of physical exams under the direction of a licensed physician. In addition, the exams:

- △ must be at no cost to the employee.
- △ must be at a reasonable time and place.
- △ must be prior to an employee wearing a negative pressure

- respirator.
- △ may be more often if determined by the physician.

Content of the Exam

- △ Medical and work history.
- △ Mandatory questionnaire in Appendix D of the Asbestos Standard.
- △ Pulmonary function test.
- △ Any other tests that the physician feels necessary.



General Physical Exam

The physician must send a written opinion to the employer containing the physician's opinion as to whether the employee is medically able to perform the work. Included in the report:

- △ Any condition which would place the employee at an increased risk due to exposure to asbestos.
- △ Any limitations concerning wearing any of the required PPE.
- △ Nothing unrelated to the employee's ability to perform the assigned tasks.

In addition to the above summary, the employer shall furnish a copy of the written opinion **to the employee within 30 days**.

Recordkeeping

1. If the employer has supporting data that the asbestos products being used are not capable of releasing fibers, a copy of that data must be kept.
2. All monitoring reports, including date, work task, PPE, and names of employees exposed must be kept for 30 years after employment.
3. Any medical surveillance reports must be kept for **30 years after employment**.
4. Any notifications of identification, location, and amount of asbestos in a structure must be kept and transferred to successive owners.
5. All of these records are available to employees, their representatives, and any involved agencies.

Even though your employer is supposed to keep your records for 30 years after you leave the job, **it is a good idea to get a copy of your records when you leave.** Keep them in a safe place. You or your family may need them 10 - 40 years in the future.

Competent Person

The employer must have a competent person on every asbestos job when work is being performed. The duties of the competent person include frequent and regular inspections of the entire work site.

In addition to the regular inspections, **on Class I jobs the competent person shall inspect the job at least once every shift.**

For Class I and II jobs, the duties include:

- ✓ Supervise the set up of the regulated area, enclosure or other containment.
- ✓ Ensure the integrity of the containment.
- ✓ Supervise all monitoring.
- ✓ Ensure that employees are using the proper PPE.
- ✓ Ensure that all engineering controls, work practices and PPE are used correctly.
- ✓ Ensure that decontamination and hygiene practices are followed.
- ✓ Ensure that all notification practices are followed.

The above was a brief summary of the Federal Asbestos standard. It is by no means a complete listing of all of the requirements of the standard. Be sure to check all applicable Federal, State, and Local regulations. In addition to this summary, other laws and regulations apply to asbestos work.

EPA

The Environmental Protection Agency, or EPA, also regulates asbestos. In the OSHA Asbestos standard, reference was made to training, but gave no specific guidelines. The standard stated that training must be equivalent to the **EPA Model Accreditation Plan (MAP)**. There are several parts to EPA asbestos regulations. The following is a summary of these parts.

AHERA

The Asbestos Hazard Emergency Response Act of 1987 required that **all schools K - 12** be inspected for asbestos. Schools identified as containing asbestos must develop an **Operations and Maintenance Program**. Anyone dealing with asbestos in schools – workers, supervisors, inspectors, and management planners – must go through special training and receive accreditation.

ASHARA

In 1992, AHERA was amended by the Asbestos School Hazard Abatement Reauthorization Act. **ASHARA extended training requirements to asbestos workers, supervisors, and inspectors in all public and commercial buildings.**

ASHAA

The Asbestos School Hazard Abatement Act required the EPA to provide technical assistance to schools in carrying out their asbestos hazard responsibilities. It required EPA to provide funds for training people involved in asbestos removal and inspections. It also provided for funding to assist abatement of asbestos materials.

NESHAP

The **National Emission Standards for Hazardous Air Pollutants** is part of the **Clean Air Act**. NESHAP covers all public and private buildings except private homes and apartment buildings with four or less living units.

NESHAP says that you must keep asbestos out of the air. It also affects how asbestos work is done. Some of the requirements of NESHAP are:

- ⊞ Any job with 160 square feet, 260 lineal feet, or 35 cubic feet is considered a large job.
- ⊞ If there are several small jobs on the same site that if combined would equal a large job, they must be combined.
- ⊞ Asbestos must be adequately wet before it is removed or placed in airtight containers.
- ⊞ Cannot drop Asbestos more than 50' in removal or demolition.

- △ Employers must notify EPA at least 10 days before the start of a job, and if the start date changes.
- △ Buildings must be inspected for asbestos before demolition or renovations begin.
- △ Waste must be in sealed containers or wrapped in plastic and labeled with the location of the job and the name of the generator.

Ban and Phase Out Rule

The Ban and Phase Out Rule of **1989** began a seven year phased ban on all asbestos products. The ban covered flooring products, ceiling products, brakes, clutch faces and several other products. The 5th Circuit Court of Appeals overturned the Ban in 1991. **Part of the ruling stated that all asbestos products that were off of the market when the ban was overturned would not be allowed to be reintroduced.**

Additional Legislation

In addition to OSHA and EPA Regulations, many states have their own laws regulating working around asbestos. These laws must be at least as protective as federal legislation. They can be more protective. Many municipalities have also passed laws regulating asbestos work. Be sure to check all applicable laws and regulations before working with asbestos.

Key Facts

OSHA enforces laws that affect worker safety and health on asbestos jobs.

EPA enforces laws that affect the environment.

AHERA is an EPA rule that covered asbestos in all schools K - 12.

ASHARA defines AHERA training requirements and extended AHERA coverage to all public buildings.

NESHAP set rules concerning:

- **notification of demolition or renovation.**
- **work practices for removal of asbestos.**
- **no visible emissions of asbestos to outside the abatement area.**
- **waste disposal requirements.**
- **inspection prior to demolition or renovations.**

The Ban and Phase Out Rule of 1989 was to eliminate the use of asbestos in seven years. It was overturned in 1991. All products that had been removed from the market before the reversal could not be reintroduced.

RESPIRATORS AND PPE

Protecting yourself on an asbestos job is very important. If the fiber count cannot be lowered by engineering controls and work practices, additional measures will need to be taken. Respirators and other **PPE – Personal Protective Equipment** will need to be worn.

RESPIRATORS MUST BE WORN WHEN:

Class I	Class II	Class III	Class IV
Always	you are exposed above the PEL/EL or wet methods are not used or there is no negative exposure assessment* or ACM is not removed in a substantially intact state	you are exposed above the PEL/EL or wet methods are not used or there is no negative exposure assessment* or when TSI or surfacing material is disturbed	you are exposed above the PEL/EL or working in an area where other employees are required to wear respirators

* A negative exposure assessment is a demonstration by the employer that employee exposure during an operation will be consistently below the PEL/EL.

Depending on the type of work you are performing, you may need other protection in addition to your respirator. A full suit and gloves to protect you from asbestos or other chemicals may be needed. You may need eye or hearing protection. Falling objects or people working overhead may require the use of a hard hat. Matching the protection to the task is very important. You need to be protected from the hazards but not over protected. Additional PPE adds stress from the weight of the PPE and increases the chance of heat related problems.

Before You Wear a Respirator

Medical Requirements

Before wearing a tight-fitting respirator, even for a fit-test, you must have a medical exam to make sure your heart and lungs can take the strain of respirator use. The questionnaire that must be used is found in **Appendix C** of the Respiratory Protection Standard (**29CFR1910**).

134). Either the questionnaire or an exam that gathers the same information must be used. The physician administering the exam may add to the exam, but cannot subtract any parts of the exam.

There are several **medical conditions** that may prevent you from wearing a respirator – asthma or other lung problems, high blood pressure or other heart conditions – and diseases that affect the heart or lungs could make it dangerous for you to wear a respirator.

There are also psychological conditions that may prevent respirator use. **Claustrophobia** (the fear of tight, closed in places) may prevent you from wearing a respirator.

Fit-Testing

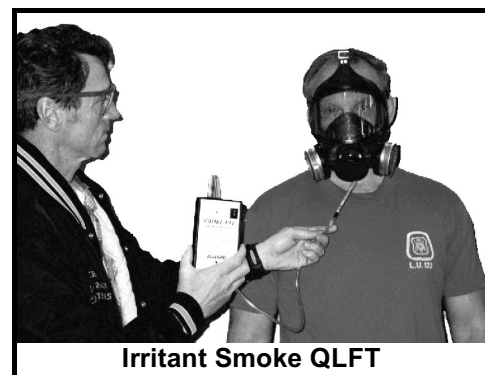
There are many different sizes and shapes of faces. **No one respirator will fit everyone.** The employer must have a selection of respirators for you to choose from.

Before you wear a respirator with a tight fitting facepiece, you must have a fit-test. This is to make sure that the facepiece fits properly. If the facepiece is the wrong size or style, it will allow asbestos to leak in.

There are two types of fit-tests: **Qualitative** and **Quantitative**. The type of respirator being worn and the work being performed will determine the type of fit-test needed.

Qualitative Fit-Test (QLFT)

A Qualitative fit-test relies on the test subject detecting a taste or odor. Before the test begins, the test subject is exposed to a weak sensitivity concentration of the test solution to see if they can smell or taste it. If it can be detected, the subject is given 15 minutes to clear the taste from their senses. Then the subject dons the respirator, waits 5 minutes for the respirator to warm up and mold to the face, and begins the test. **A properly administered Qualitative fit-test takes a**



minimum of 30 minutes to complete.

The protocol for the tests are listed in the Respiratory Protection Standard (**29CFR1910.134 Appendix B**). There are a minimum of 7 exercises that must be performed for 1 minute each. If the subject does not detect the fit-test agent during the test, the test is passed.

There are four substances that can be used for Qualitative fit-tests: **Bitrix; Irritant Smoke; Saccharin; and synthetic Banana**



Oil. Each substance has its own set of instructions on how to perform the tests. These are listed in Appendix B of the Respiratory Protection Standard. Be sure that the person administering the test is doing it correctly. If the test is not done properly, the respirator may not protect you the way it should.

The down side of the Qualitative fit-test is that the test can be faked. **Two of the test solutions (Saccharin and Banana oil) have no offensive taste or odor.** Fear of failing the test or not getting the job may cause someone to not report tasting or smelling the solution.

The Qualitative fit-test may only be used for tight fitting negative pressure respirators with a protection factor of 10 or less, or for positive pressure tight fitting Type C respirators. If a protection factor greater than 10 is needed for a negative pressure respirator, a Quantitative fit-test must be used.

Quantitative Fit-Test

A Quantitative fit-test is a special kind of fit-test that uses a machine to check the fit of the respirator. **The machine measures the dust or a test substance in the air, and compares it to the**

amount of dust inside the mask. This test is very accurate. It is also impossible to fake.



Like the Qualitative fit-test, the Quantitative fit-test has 7 exercises of one minute each. However, there is an extra exercise that takes 15 seconds to do. It is called the grimace, where the subject smiles or frowns to break the seal. The machine will then measure how well the respirator reseals.

The Quantitative fit-test may be used for any tight-fitting respirator, but **must be used for any negative pressure respirator that requires a protection factor greater than 10**. Either a special facepiece with an adapter or an add-on adapter is needed to connect to the machine. To test a positive pressure respirator, the respirator is modified to accept filters and is tested in the negative pressure mode.

Additional Requirements for Fit-Testing

You must be fit-tested **at least every 12 months**. This is a minimum. You may need to be tested more often. Any changes in the shape of your face may require a fit-test. Broken bones in the face, dental work, or a gain or loss of weight may all change the shape of your face, requiring another fit-test.

Respirators

Respirators are divided into two basic classifications: Air Purifying Respirators (**APR**) and Air Supplying Respirators (**Type C**). In each classification, there are several different types of respirators. They all have several things in common.

1. All respirators must be approved by NIOSH (National Institute of Occupational Safety and Health).
2. No respirator is perfect. They all leak.
3. You must be fit tested before using a respirator and once a year for as long as you are required to wear one.

4. You must have a special medical exam before you wear a respirator and once a year for as long as you wear one.
5. You must be trained on how to: inspect; put on; perform checks to ensure that it was put on correctly; use and limitations of the respirator; take it off; clean; and store a respirator.

Air Purifying Respirators

There are several things that you must know before you can wear an APR. You have to know the contaminant so that you know which filter to use. You need to know the amount of oxygen in the air. APRs do not supply oxygen.

Half-Face APR – Good up to 1 f/cc

A half face APR is the most common respirator on an asbestos abatement job. The half face APR covers the nose and mouth of the wearer. There are either one or two filters that attach to the mask. These filters trap the small asbestos fibers and keep you from breathing them in.



Filters that protect you from asbestos are called **HEPA (High Efficiency Particulate Air)** filters. These filters will trap **99.97% of all fibers 0.3 microns in diameter** (1/150 the diameter of a human hair). HEPA filters are color-coded Magenta, a reddish/purple color.

You may need protection from other chemicals in addition to asbestos. Then you would use what is called a **combination filter**. This is a special filter that is stacked, or joined with a HEPA filter. Do not attempt to build your own combination filter using tape or some other means to stack cartridges. Use only manufactured cartridges.

All cartridges are color coded as to their use. Even though filters are color-coded, always read the label to be sure that you are using the right filter.



Full-Face APR – Good up to 5 f/cc

A full-face APR covers more of your face than a half-face APR.

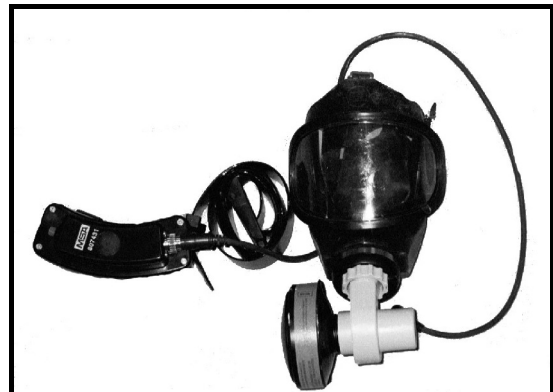
Rather than sealing to your face around the nose and mouth, a full-face seals across the forehead and the sides of your face. A full-face APR provides eye protection as well as respiratory protection.



The filters for a full-face APR are exactly like the filters for a half-face APR of the same model. They may be HEPA filters only, or they may be combination cartridges, depending on the needed protection.

Powered Air Purifying Respirator – Good up to 10 f/cc

A powered air purifying respirator (PAPR) is **usually a full-face APR with a small fan attached**. The worker wears a battery pack on the waist, with a power cord that goes to the facepiece. On the facepiece there is a small fan that draws air through a filter or filters and delivers it to the mask.



The fan helps relieve some of the stress on your lungs. Rather than your lungs supplying all of the force to draw air through the filters, the fan does some of the work.

The fan delivers air at a constant rate, regardless of how much you need. If the battery runs low or the fan stops, you must supply all of the force to draw air through the filters. If you need more air than the fan can deliver, your lungs must pull the air through the filters. This is called “over-breathing the respirator”.

If you wear an APR on an asbestos job, you have the right to request a PAPR and your employer must give you one.

Other APRs

Half-face PAPRs and loose-fitting hooded or helmet PAPRs and are

are not recommended. Over-breathing these types of respirators allows air to leak in around the sides of the respirator, exposing the wearer to asbestos fibers.

Disposable paper dust masks are **not** allowed on asbestos jobs. They do not offer enough protection. If you are unsure about your APR, talk to your contractor's respirator program administrator.



Type C Respirators

Continuous Flow – Good up to 10 f/cc

A type C continuous flow respirator supplies air from an outside source, either from a compressor or from air tanks. There is no additional strain on your lungs when wearing a Type C respirator.

Type C respirators are supplied by an air hose. You must drag the hose with you wherever you go. You can trip over the hose and fall. The hose can become tangled and crimped, cutting off your supply of air. **You should always have an escape (egress) bottle or an attached HEPA filter in case you lose your air supply.**

A Type C continuous flow respirator delivers air at the same rate, regardless of how much you need. If you are not working hard, the extra air will blow out of the mask and push the fibers away from you. But if you are working very hard and require a large amount of air, **it is possible to over-breathe the respirator.** When you over-breathe the respirator fibers can leak into the mask.

Pressure-Demand Supplied-Air Respirator – Good up to 100 f/cc

A Pressure Demand Type C respirator is similar to the Type C continuous flow respirator except that there is always more pressure inside the mask than outside the mask. **You cannot over-breathe a pressure demand respirator.** If the mask leaks, air will escape and push the fibers away from the mask.

There are two types of Type C Pressure Demand respirators: without an escape bottle; and with an escape bottle. **The respirator with the escape bottle offers the maximum protection.** If



something happens to your air supply, you simply open the escape bottle. It will give you enough air to exit the work area.

Protection Factors

Every respirator has a protection factor. A protection factor tells you how well a respirator will protect you. The higher the protection factor, the better protection a respirator gives.

A protection factor is determined by dividing the concentration of a substance outside of the mask by the concentration inside the mask. For example: If the measured concentration of asbestos is 10 f/cc outside of a half-face APR and 1 f/cc inside the mask, the protection factor would be 10 (10 divided by 1 equals 10). What this means is that for every 10 fibers in the air outside the mask, 1 fiber leaks in.

Protection Factors for Respirators Commonly Used in Asbestos Work

Respirator	Protection Factor	Maximum Use
Half- Face APR	10	1 f/cc (For every 10 fiber in the air, 1 may leak in)
Full-face APR	50	5 f/cc (For every 50 fibers in the air, 1 may leak in)
Full-face PAPR	100	10 f/cc (For every 100 fibers in the air, 1 may leak in)
Full-face Type C pressure-demand	1000	100 f/cc (For every 1000 fibers in the air, 1 may leak in)

No respirator is perfect. They all leak. Protection factors take this into consideration. (A change in the Respiratory Protection Standard is pending. If adopted, a full-face PAPR will have a protection factor of 1000 and filtering facepieces will have a protection factor of 10. The filtering facepiece will not be legal on an asbestos job – just as the nuisance dust mask. Also, MUCs [maximum use concentration] are included.)

If you experience any difficulty while wearing a respirator, leave the work area immediately. Do not try to repair or adjust your respirator

in a contaminated area. Adjusting your respirator in the work area will break the seal and allow asbestos fibers to enter the facepiece.

Putting On Your Respirator

Every time you put on, or don, your respirator there are simple checks that you can do to make sure you have put it on properly. These checks must be done every time you don the respirator. They can also be done while you are working to make sure that your respirator is fitting correctly.

Negative Pressure Seal Check

To do the negative pressure fit check, **cover the filters** with your hands or a piece of plastic. Breathe in and hold your breath for 10 seconds. **The facepiece should collapse against your face** and stay there. If it leaks out, readjust the facepiece and try again.



Positive Pressure Seal Check

To do the positive pressure check, **cover the exhalation valve** and breathe out slightly. The respirator should “puff out”. Do not breathe out hard enough to break the seal. Hold your breath for 10 seconds. **The respirator should stay puffed out.** If it leaks out, readjust, and try again.



If you adjust your respirator for any of the checks, redo the entire fit check process. If your respirator gets bumped in the work area, stop and perform the fit checks. If your respirator is leaking, leave the work area to readjust the facepiece or to fix the problem.

Cleaning and Storage

Your respirator must be cleaned and stored properly for it to work right. A dirty respirator will not protect you. A respirator that is not stored properly will not protect you.

Your respirator should be cleaned whenever it gets dirty. At a minimum, it should be cleaned every day. To clean your respirator,

wash it in warm water with soap or a commercial respirator cleaner after it has been rinsed off in the shower room of the decon. Rinse the respirator, take it apart, and dry it. Inspect each part as you put it back together. If you have been trained on repairing your respirator, repair/replace any damaged parts as you reassemble it. If you have not been trained, give your respirator to a qualified person for repairs.

Store your respirator in a clean dry area. Do not store it where it can become damaged, deformed, or dirty. **Do not hang your respirator on a peg or nail.**

Respirator Key Facts

You must have a medical exam before wearing a tight fitting respirator.

You must be fit-tested before wearing a tight fitting respirator.

Qualitative Fit-Test – The wearer must tell if they smell or taste the fit-test solution. Good for a protection factor of 10 and for positive pressure Type C respirators

Qualitative Fit-Test– A machine measures the amount of contaminant that enters the mask. Required for negative pressure respirators with a protection factor greater than 10.

If you are required to wear a negative pressure respirator, you can request a PAPR.

Do a positive and negative fit check every time you don your respirator.

Clean your respirator when it gets dirty, but at least once a day.

Store your respirator in a clean, dry place.

PERSONAL PROTECTIVE EQUIPMENT

In addition to respirators, you may need additional protection. Depending on the hazards involved, you may need suits, gloves, eye protection, hard hats, and other equipment. Matching the personal protective equipment (PPE) to the hazard will provide the best protection with the least amount of stress.

Outer Clothing

When working with asbestos, you need to keep the asbestos off of your clothing. Asbestos is not a contact hazard, but if you get asbestos on your clothing, you will take it home to your family. You will wear either disposable clothing that is discarded after each use or reusable outer clothing that can be cleaned and reused.



If you wear disposable clothing, you will put on a clean suit each time you enter the work area. The suit will either be one-piece or a suit with a detachable hood. The suit is usually made of paper for protection from asbestos, or a plastic-like material for protection against other chemicals. These suits are used once and disposed of as asbestos waste.

You may wear outer clothing that can be laundered and reused. If you use this type of protection, **do not take the clothing home and launder it.** Your employer must send it to a special laundry that knows how to clean clothing contaminated with asbestos. The laundry must use special precautions when cleaning the clothing to protect their workers. The waste water must be filtered before it is discharged into the sewer system.

Regardless of the type of clothing being worn, **all workers must wear some type of protective covering over their head** to prevent asbestos from getting in their hair. When wearing the head covering, be sure to tuck all hair under the covering. If you get asbestos in your hair, it is very difficult to remove.

If your employer does not provide **shoes or boots** for your use, you must use **foot coverings** to keep asbestos off of your shoes. Remember, anything that has the potential to be contaminated must be covered.



Gloves



Gloves are very important for protecting your hands, not from the asbestos, but from cuts and scratches. **Most asbestos removal involves demolition.** Sharp edges on the building materials are very dangerous. Leather or other tough gloves will provide the best protection.

If you are using chemicals to remove asbestos-containing glues or mastics, you will need protection from these chemicals. **No one glove will protect you from all chemicals.** Be certain to use the proper glove for the best protection.



Other Protective Equipment

In addition to protecting you from asbestos and other chemicals, you may require other protective equipment.



Hard hats to protect you from falling debris may be needed. **Goggles** or safety glasses for eye protection should always be worn. Depending on the situation, an additional **face shield** may be needed.



When working on elevated platforms, some type of **fall protection** is needed. Guardrails or personal fall arrest systems are required. **Ladders** are also dangerous. Placing the ladder properly and following safe work practices will reduce the chance of falls.

The work area will be lined with plastic. When removing asbestos, **wet methods are used.** Water and plastic produce extremely slippery walking surfaces. Keeping the work area clean and using shoes or boots



with soles that grip will reduce the chances of slips and falls. Using ladders with special non-slip rungs will also reduce the chance of falls.

Giving special attention as to the way the work is performed, using equipment that is designed for wet areas, and modifying the way you work will reduce the likelihood of serious accidents.

PPE Key Facts

Match the PPE to the hazard.

Your employer is responsible for providing the proper PPE.

Disposable clothing must be labeled and disposed of as asbestos waste.

Reusable clothing must be cleaned at a special laundry.

Do not wear your PPE home or launder it yourself.

If your suit tears, repair it immediately.

If your suit cannot be repaired, leave the work area and get a new suit.

Depending on the hazard, you may need special suits or gloves.

Wearing more PPE than needed will increase stress on the body.

Suits and head coverings trap body heat. Extra precautions must be taken to avoid heat related problems.

Unit 4
Respirators and PPE



CONTROL METHODS

When asbestos containing materials are found in a building, the owner must decide which method or methods will be used to deal with the asbestos. The decision will be based on how likely the asbestos is to release fibers into the air. One or a combination of methods may be used.

Control Methods

As a worker, you will probably not be involved in the decision making process. However, as the work progresses, changes in conditions may require a worker to report problems with a control method that will change the process being used.

There are five ways to control the release of asbestos fibers:

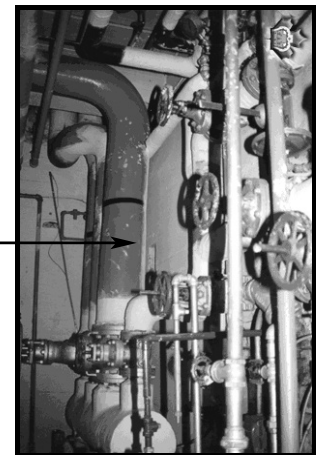
1. Encapsulation
2. Enclosure
3. Repair
4. Removal
5. Operations and Maintenance Program

Location and condition of the asbestos, the use of the building, and the occupants of the building will be considered when deciding which method or methods to use.

Encapsulation

Encapsulation is the application of **a thick, paint-like material on asbestos containing material**. The encapsulant may be applied with **a low pressure sprayer**. The encapsulant then hardens and prevents the release of fibers into the air.

There are two types of encapsulants: **bridging** and **penetrating**. **Bridging encapsulants form a protective coating over the asbestos**. Penetrating encapsulants soak into the



material and then harden. The type of asbestos being encapsulated will determine the type of encapsulant used.

The asbestos material must be in good shape for an encapsulant to work. Any loose asbestos must be removed. Any damage to the asbestos or underlying surfaces must first be repaired.

Use only a low pressure sprayer when applying encapsulants. This will reduce the amount of fibers that are released into the air. Even with a low pressure sprayer, you will be exposed to asbestos fibers. You must wear a protective suit and respirator.

Enclosure

An enclosure is **an airtight barrier around the asbestos**. The enclosure can be built out of wood, metal, or sheetrock. All seams must be sealed completely and be air-tight. **If the structure is not air-tight, it is not an enclosure.**

Another type of enclosure is called **encasement**. Encasement is a **new covering built over the asbestos material**. For soil, pouring a layer of concrete over the asbestos contaminated dirt would be an encasement. For interior encasements, spraying a closed cell foam over the asbestos would seal the asbestos in place.

Removal

Removal is the most common way of controlling asbestos. **It is a permanent solution. The asbestos containing materials are removed and replaced with a non-asbestos containing material with similar properties.**

Removal consists of taking the asbestos off of whatever it is on. The waste is bagged and sent to a special landfill. A removal job not only deals with the asbestos that you can see, but also with the asbestos that you cannot see. During removal, large amounts of asbestos fibers are released into the air. They are spread over the entire containment area. The entire area must be cleaned for a removal job to be successful.

Removal, encapsulation and enclosures are considered Class 1 work. All of these methods will release fibers into the air. Removal releases large amounts of fibers into the air. Precautions must be taken to lessen fiber release and to contain the fibers to the work area.

Many times, damaged asbestos will need to be removed before encapsulation or to attach an enclosure. Tools, such as saws, nail guns, or drills will disturb the fibers and put them into the air.

For all three methods, a containment must be built. Workers must wear suits and respirators. A decontamination area must be built at the containment. Any waste generated is considered asbestos waste and must be disposed of properly.

Repair

Repair jobs are usually small in nature. They involve limited amounts of asbestos. Repairs are usually made to a small section of pipe or a small area of wall or ceiling. A patch is placed over a damaged area to control fiber release. The patch is then painted with a mastic to seal the patch.

Glovebags usually are considered maintenance jobs. A small amount of asbestos insulation is removed from a pipe or valve so that the pipe or valve can be repaired or replaced. The area is then re-insulated with a non-asbestos insulation.

A glovebag is considered a mini-enclosure. All of the work is contained inside the bag. Glovebags can only be used to remove 3' or less of material. For removing asbestos from a larger area, a full containment must be built.

Operations and Maintenance

Operations and Maintenance is a control program for managing asbestos that remains in a building. The O&M program is basically **a paper trail that lists how asbestos is dealt with.** The parts of an O&M program are listed on the next page.

- ✍ A list or inventory of all asbestos containing material in the building. This includes the location, condition, and types of materials.
- ✍ Labeling of all asbestos containing materials to alert workers of the presence of asbestos.
- ✍ Inspection procedures and times to ensure that they are in good shape.
- ✍ Training for maintenance workers on how to deal with small releases of asbestos.
- ✍ Work procedures for removal of small amounts of asbestos for repairs to pipes or valves.
- ✍ Providing the proper equipment to maintenance workers so that they can do the work safely.
- ✍ Procedures for dealing with accidental damage to asbestos containing materials.

The point of an O&M program is to prevent the release of asbestos fibers into the air and throughout the building. This protects the occupants of the building, maintenance workers, and outside contractors. All parts of the O&M program must work.

Key Facts

Controlling the spread of asbestos fibers is the goal of all Control Methods.

There are 5 different methods to control the release of fibers: Encapsulation; Enclosure; Repair; Removal; and Operations and Maintenance.

All are temporary except for removal. The other methods manage the asbestos in place.

A combination of methods may be used on the same job.

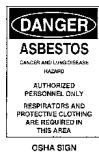
SETUP

One of the best ways to control the amount of asbestos that you are exposed to is to keep it out of the air. Working in a controlled and careful manner is very important, but there are other things that you can do to lessen your exposure.

Proper setup is often 40% or more of a job. A proper setup will protect you, workers in other parts of the building, and the environment.

The following outline lists the steps in setting up (controlling) a Class 1 job. Many of the practices are not required by law, such as two layers of plastic on the floor. Regulations only state an impermeable drop cloth. **The practices being described are considered best practice.** Be sure to check all federal, state, and local laws for guidance.

Warning Signs



Put up barricades to keep non-workers out of the area. Place signs on the barricades and in the surrounding area. These signs should be at eye level and in a language that the occupants of the building and other workers can understand.



Utilities

All power should be shut off to the work area. This includes electric, gas, water, any machinery, and the HVAC system. Place a **lock or tag on the power supply**. Turning off a switch is not enough. After turning off the power, check the switch to ensure that the right power supply was turned off.

In rare cases this is not possible. Extra care must be taken when working around live electrical or mechanical systems.



Temporary Power

Power will need to be supplied to the work area. Lights, the negative air machine, and any power tools will need electricity.



Removal of asbestos involves water. Extra care must be taken when using water around electricity. Any temporary power that is supplied to the work area must be protected with **Ground Fault Circuit Interrupters (GFCI)**.

Do not allow the cords to lay on the floor where they may be damaged or workers can trip on them. Tape them up off of the floor.

Decontamination

Next build the decontamination chamber. Any worker who enters the containment must exit through the decontamination chamber or decon. The decon normally has three rooms in this order (exit): the **equipment room** - often called the dirty room; the **shower**; and the **clean room**. The sequence is reversed for entry to the regulated area.



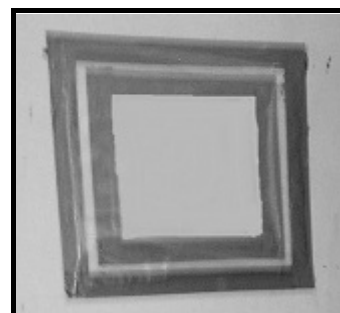
Access to and exit from the work area is always through the decon. The doors are designed to keep asbestos fibers from leaving the work area.

Decons can be built on-site out of wood, metal or plastic frames that are covered with two layers of plastic. Other contractors may choose to use a pre-made decon that they purchase. Either way is acceptable.

Contractors often build a separate decon for waste, called a **waste load-out**. Anything that leaves the work area must be decontaminated. This includes any bags, wrapped waste, tools, or other materials.

Critical Barriers

All openings to the work area must be covered and sealed. These coverings are called critical barriers. Any openings for heating, ventilation, or electrical must be covered and sealed. All windows and doors must be covered and sealed with two layers of plastic at least 6 mils thick. One door must be left open for access. This door will lead to the decon area.



Clean, Remove, or Cover

The next step is to clean the work area. Clean everything in the area, including walls, floors, air vents, outlets, and any stationary or removable equipment. **Cleaning before building the containment will help in obtaining final clearance.** What good would it do to remove the asbestos if there was still asbestos dust present when you were finished?



Use damp rags and a **HEPA vacuum** when you clean. The damp rags will trap the asbestos fibers and prevent them from becoming airborne. After you wipe everything with a damp rag, HEPA vacuum the entire area. **Do not use a regular shop vacuum.** The filters in a regular shop vacuum are not designed to trap asbestos fibers.

The fibers will simply be redistributed in the air. Wet wipe the entire area again to clean any fibers that may have been missed.

After cleaning, **remove everything from the work area that you can.** This will make the asbestos removal job easier. It will also eliminate the possibility of damaging or contaminating these objects.

If you cannot remove items such as large pieces of equipment, cover them. Use two layers of plastic and seal the edges of the plastic to the floor or walls.

If an item cannot be cleaned, such as carpeting, wrap the item in two layers of plastic, label it, and remove it for proper disposal.



Negative Air

After everything is either cleaned and covered or removed, bring in the negative air machine. **Discharge the exhausted air outside of the containment area, usually out a window or a door.** A special connection will need to be made. Connect the discharge tube and seal the connection.

The number and size of negative air machines will be determined by the assigned tasks and the size of the work area. There must be enough volume to keep the pressure lower in the work area than outside of the area. This will ensure that any leaks will allow air to enter the containment rather than allowing asbestos to escape the area.



The negative air machine(s) must operate for the duration of the job. An extra negative air machine is advisable in case one of the other machines breaks down or has to be shut off for maintenance.

Contain the Area

Building a containment will keep the asbestos from spreading to other parts of the job. The containment is usually made of plastic. All seams and joints must be sealed with tape to prevent leaks.

Any areas of the room that are not being abated must be covered. This will stop the spread of contamination. If only the ceiling is being abated, cover the floor and walls. The floor may need to be covered with a layer of plywood or similar materials to protect the plastic from ladders, scaffolding, or materials being removed.



The containment may be large, enclosing the entire room. In some situations it may be a “mini-enclosure”, only large enough to enclose a small area for small projects. Both containments are similar in that they must be completely sealed except for the entrance, and must be under negative pressure.

Bring Any Needed Tools into the Room

After the containment is built, bring any needed tools, ladders, or scaffolding into the work area. Many times, ladders and scaffolding are too large to fit through the decon.

Position and Attach the Decon

After all of the large equipment is in the work area, position and attach the decontamination chamber. The decon must be sealed to the work area so that no asbestos fibers can escape.

After the decon is attached, anyone or anything that enters or leaves the work area must pass through the decon.

Test the Containment

After the containment is built and the decon is attached, test the containment for leaks. Use ventilation smoke to see if air is moving out of the containment area.



Turn on the negative air machine(s). **Any air that is entering the containment should only enter through the decon.**

From this point on, the negative air machine must run constantly.

The containment must be checked before every shift. Any leaks must be patched immediately. It is a good idea to have the workers observe the plastic for leaks or tears as they work. Seal all leaks as they are noticed.

Setup is a very important part of any asbestos abatement job. In many cases, **setup will be as much as 40% of the work on the job.** Building the containment properly will make the rest of the job easier and safer.

Key Facts

Setup is a major part of an asbestos job.

You must be protected during setup. Respirators, other PPE, and decontamination are needed.

Proper setup will make the rest of the job safer and easier.

WORK PRACTICES

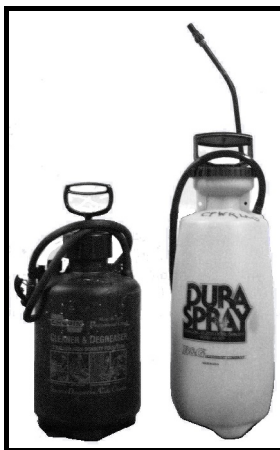
In addition to the control methods mentioned, there are several things that you as a worker and your employer can do to reduce the amount of asbestos in the air.

Following these simple rules will greatly reduce the amount of asbestos that you will be exposed to and the chance of it leaving the work area.

Keep it Wet

Keeping asbestos wet during setup, removal and bagging will greatly reduce the amount that gets into the air. **The asbestos should be moist** (about the consistency of oatmeal) without being saturated.

Keep the asbestos wet until it is sealed in bags or other containers for disposal.



Asbestos does not accept water very well. An additive must be mixed with the water. This additive is called a **surfactant**. A surfactant breaks the surface tension of the water and allows it to be more easily absorbed.

Only low pressure sprayers should be used to apply the amended water. High pressure sprayers such as a garden hose will put out too much water.

Any water that is used must be collected and disposed of as asbestos waste. The force of the water will dislodge fibers and put them into the air.

Contain the Area

Putting up critical barriers and containing the work area will prevent asbestos from moving to other parts of the building. Covering any areas not being abated will stop the spread of asbestos and prevent the need for extensive cleaning after the job is complete.



Mini-Enclosures



For some jobs, you may not need to enclose the entire room to perform your work. You may build what is called a “mini-enclosure”. A mini-enclosure is built the same way as a full containment, only smaller. It is made to accommodate only two workers. A mini-enclosure is ideal for small jobs such as working above a ceiling where only one tile needs to be removed for access.

Filter the Air

Using **HEPA vacuums and negative air machines** to filter the air in the work area will lower the amount of asbestos in the air. You cannot use a regular shop vacuum for cleaning. A shop vacuum is not designed to filter very small fibers of asbestos from the air.



Use Negative Air Pressure

Lowering the pressure inside the containment area will keep asbestos from leaking out. If the pressure is lower in the work area, any leaks will allow air to enter, not fibers to escape. **Lowering the pressure can be done by using a negative air machine for larger jobs or with a HEPA vacuum for smaller jobs.**

The negative air machine will also help to cool the work area. This will reduce the stress on the workers. Unfortunately, it will also dry out the asbestos quicker. Bagging the waste immediately is essential.

Clean Up Waste Immediately

Cleaning up the waste immediately will lower the amount that gets into the air. If waste is allowed to accumulate, it will dry out before it is bagged for disposal. If waste does begin to pile up, wet it again before handling it. Consider adding workers to bag the waste quicker.



Waste should not be permitted to accumulate on the floor or other walking surfaces. If workers walk on the waste, they will break the fibers into smaller pieces. These fibers will be forced back into the air. Always bag waste as soon as it is removed.

Never force air from the waste bag. Use a HEPA vacuum to remove the air. Seal the bag, **wrap the end back on itself, and seal again. This is called “goosenecking”**.

Double bag or double wrap all waste. This will ensure that the asbestos is contained and will not leak out. After double bagging or wrapping, apply the required labeling. All waste material must contain the following label:

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

Working on High Areas

If you are working more than 50' above the floor, you must catch the asbestos. You cannot let it fall to the floor. Bag it and lower it to the floor or slide it down an enclosed chute.

Even though NESHAP says you cannot drop asbestos more than 50', it is a good idea to catch all asbestos if possible. This will lower the amount that gets in the air and make cleanup easier.

Work in a Careful and Controlled Manner

When working around asbestos, work in a careful and controlled manner. Do not rip and tear when removing asbestos. This will put more fibers in the air.

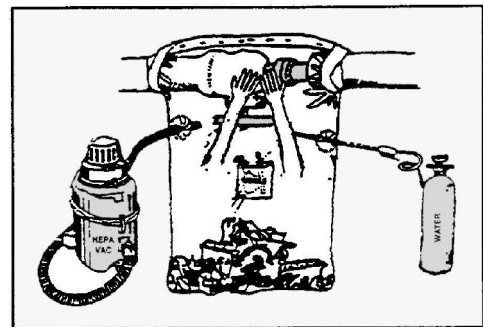
When doing demolition, dropping asbestos containing materials may damage the containment. All materials should be bagged and lowered to the floor by **rope** or slid down an **enclosed chute**. Double bag or

wrap all materials as soon as possible and remove them from the work area. This will prevent the asbestos from drying out and releasing fibers into the air.

Glovebagging

You may not need to build an entire containment if you are removing a small amount of asbestos. For removing small amounts of asbestos from pipes you may use a glovebag.

A glovebag is a mini-containment that is attached to the pipe to totally enclose the work being done. Glovebags are for small jobs only. You cannot remove more than 36" of asbestos containing material. The amount that can be removed is determined by the size of the bag. Glovebags cannot be any larger than 60" x 60".



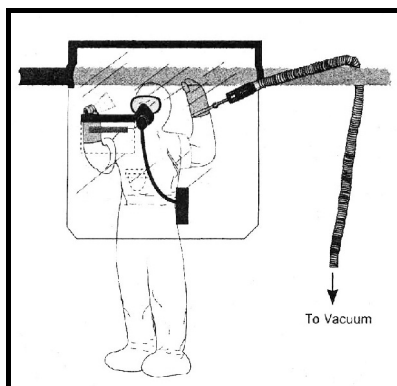
Glovebags are usually associated with repair jobs. They are used to remove small amounts of asbestos from pipes or valves for repair or replacement of the pipe or valve.

Before attaching the bag to the pipe, make sure that the area where the attachment is made is in good condition. Wrap tape around the pipe to get an airtight seal. Place a layer of poly on the floor to catch anything that may be dropped during removal.

When using a glovebag, two people must do the work. One person does the removal while the other person operates the water spray. It is difficult to see the entire way around the pipe. Usually, one person is on one side of the pipe and the second person is on the other side. The second person can act as the eyes on the back side of the pipe.

All tools and materials are placed inside the bag before it is attached to the pipe. The bag is sealed to the pipe and tested with smoke to make sure it is airtight.

One person inserts his or her arms into the sleeves that are built into



the bag to perform the task. Any materials that are removed are placed gently in the bottom of the bag. Do not allow materials to fall, as they may puncture the bag.

When the task is done, wet and wipe the inside of the bag to trap any fibers and prevent their release when the bag is removed. After the bag has been cleaned inside, all tools are gripped in one hand. As the hand is pulled from the sleeve, the sleeve turns inside out, and the tools are left in the glove. The sleeve is sealed with two pieces of tape and the glove is cut off between the tapes. The tools are removed from the glove in a bucket of water to prevent fibers from getting into the air.

Use the HEPA vacuum to collapse the bag and seal the waste in the bottom of the bag with tape. Cut the glovebag from the pipe and place it in a disposal bag. Remove the tools from the glove and put the glove in the bag. Clean and remove the poly from the floor and place it into the waste bag. Dump the water from the tool removal bucket into the waste bag and use the HEPA vacuum to remove all of the air from the bag. Seal and gooseneck the bag, then place it in another waste bag and gooseneck again. Attach a label and send to an approved waste site.



Key Facts

Regardless of which method is used for removal - full containment, mini-containment, or glovebag - all methods have several things in common.

- 1. Contain the area to control the spread of fibers.**
- 2. Keep the asbestos wet to keep fibers out of the air.**
- 3. Double bag or double wrap all waste as soon as possible.**
- 4. Remove the waste from the work area as soon as possible to reduce clutter and to prevent slips, trips, and falls.**

Glovebags are for small removal jobs only. Bags cannot be moved or reused.

Two people are required for all glovebag jobs.

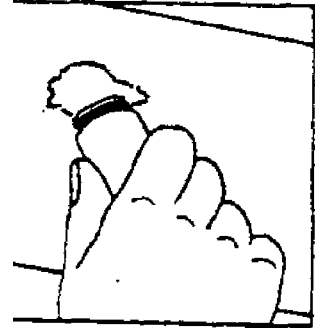
VAT



SAMPLING AND MONITORING

Sampling

The only way to determine if a material contains asbestos is to send a sample to a lab. No-one can tell if a material contains asbestos by looking at it. Many materials look the same. Building materials that contain asbestos look exactly the same as materials that do not contain asbestos. A small piece of the material must be removed and sent to a lab to determine if it contains asbestos.



Special precautions must be used when the sample is taken. The person taking the sample should wear a respirator and suit and decontaminate after taking the sample.

The material from which the sample was taken must be sealed after the sample is taken to prevent asbestos fibers from getting into the air.

The sample is labeled and placed in a sealed container for shipping to the lab. At the lab, the contained is opened and analyzed using a **Polarized Light Microscope**. A report is sent to the building owner listing the materials that contain asbestos and how much asbestos they contain. Decisions are then made on how best to deal with the asbestos containing materials.



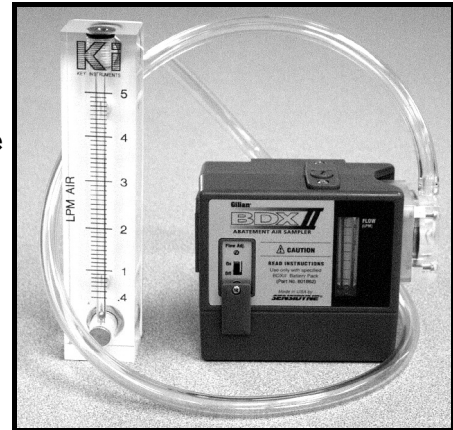
Monitoring

The air also must be monitored to find out how much asbestos is in the air. There are two ways to determine how much asbestos is in the air: **personal monitoring and area monitoring**.

Personal Monitoring

Personal monitoring is done by hanging a small **“personal sampling pump”** on a worker from each crew, usually one out of every four workers. The sample is collected in a **special filter** attached to the pump. The sample is identified with the name of

of the person that wore the pump, the task being performed, the number of the pump, and the amount of time that the pump was worn. **This sampling cassette is sent to a lab to be analyzed.** The lab analyzes the sample and sends a report to the employer. This report lists the amount of asbestos that the worker was exposed to.



The sample is collected in the wearer's **"breathing zone"**. This is an area within **12"** Of the person's nose and mouth. High readings may mean that the work is not being performed properly. More water may be needed to control the fibers. A different work method may be needed that releases less fibers. If the fiber count cannot be lowered, a higher level of PPE may be needed.



Area Monitoring

Monitoring is also done to determine how much asbestos is in a certain area. **An area monitor looks similar to a personal sampling pump. The main differences are the size of the pump and the amount of air that is drawn through the filter.**

Area monitoring is used to find out if the containment is controlling the spread of fibers. These pumps are set up outside of the containment in other areas of the building. If asbestos is found, the containment is not working and needs to be changed or repaired.

Area monitors are also used inside the containment to determine if the work is being done properly. If the fiber counts are too high, work methods need to be changed to lower the amount of fibers released.

Final Clearance

After the work is done, monitoring is performed to see if all of the asbestos has been successfully cleaned up. Area monitors are placed in the work area. **Aggressive sampling is done.** The people

doing the sampling use leaf blowers to stir up the air. They are trying to put fibers into the air.

The samples are sent to a lab for analysis. A special microscope, called a **Transmission Electron Microscope (TEM)**, is used to analyze final clearance samples from schools and may be used for other final clearance samples.

A.H.E.R.A. LABORATORY ANALYTICAL REPORT TRANSMISSION ELECTRON MICROSCOPY SAMPLE		NVLAP #
ELAP #		
CLIENT:		
ADDRESS:		
SITE: N/P		
DESCRIPTION: AHERA TEM ASBESTOS AIR SAMPLE		
LOCATION: N/P		
PROJECT #:		
DATE COLLECTED: N/P		
DATE RECEIVED: 10/27/89		
DATE ANALYZED: 10/27/89		
ANALYTICAL SUMMARY		
AVG. GRID SIZE: 0.007255 MM ²	# GRID OPEN	
AREA ANALYZED:		
TOTAL ASBESTOS STRUCTURES: 1		
ASBESTOS TYPE: Chrysotile	TOTAL TIME: N/P Minutes	
TOTAL NON-ASBESTOS STRUCTURES: 4-(Si, S. Cellulose)	FLOW RATE: 10.0 LPM	
AMBIGUOUS STRUCTURES: N/A	TOTAL VOLUME: 1500 Liters	
SAMPLE RESULTS		
ASBESTOS FIBER CONCENTRATION: 13.8408	Si+2//	0.0036 S/cc
ANALYTICAL SENSITIVITY: 0.0036 S/cc		
ASBESTOS FIBERS ≥5 MICRONS IN LENGTH: 1	PERCENT OF TOTAL CONCENTRATION: 100	
ASBESTOS FIBERS <5 MICRONS IN LENGTH: 0	PERCENT OF TOTAL CONCENTRATION: 0	
Transmission Electro Microscopy (TEM) asbestos samples are analyzed by trained microscopists in accordance with EPA AHERA 40 CFR Part 763: ASBESTOS-CONTAINING MATERIALS IN SCHOOLS: FINAL RULE.		
_____ is not responsible for the accuracy of the data received from its clients that is used to calculate s/cc.		
COMMENTS:		
ASBESTOS ANALYST:		LABORATORY DIRECTOR:
DATE:		

CLEARANCE AIR SAMPLE REPORT FROM A LAB

If removal and cleanup have been done properly, the readings will be low. But if removal and cleanup have not been done properly, fibers will be blown into the air and collected on the filters. If the readings are too high, the cleanup must be done again until the job passes.

Key Facts

The only way to tell if a material contains asbestos is to send a sample to a lab.

Special microscopes called Polarized Light Microscopes or Transmission Electron Microscopes are needed to accurately determine the amount of asbestos in a sample.

Monitoring is done to determine the amount of asbestos in the air.

Personal air samples must be taken in the worker's breathing zone.

Changes in work practices and PPE may be made based on air samples.

DECONTAMINATION

Decontamination is the act of physically removing contaminants. You must decontaminate every time you leave the work area. The decontamination area is usually the first component built on an asbestos job. The decon must be available before anyone enters the regulated area.

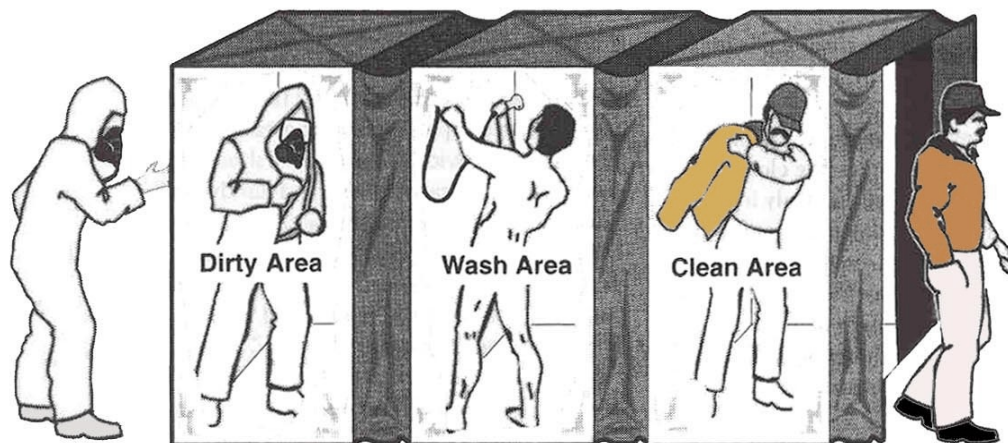
Paragraph (j) of the Asbestos standard tells how and where the decontamination area must be built. It also lists the procedures that must be followed when decontaminating.

The decon must have three rooms separated by self-closing doors: **the equipment or dirty room; the shower room; and the clean room.** Each room has a function. By following the procedures listed in **paragraph (j)**, you can safely enter and exit the work area.

Exiting the Work (Regulated) Area

Before Entering the Decon

When leaving the work area, but before entering the decon, HEPA vacuum your suit to remove any fibers that are clinging to your PPE. Start at the top and work down. It may be easier to work with a partner, with each person vacuuming the other's suit. After HEPA vacuuming your suit, enter the equipment room.



Worker enters decon from work area.

Worker exits decon after washing and changing.

Equipment Room

The equipment (“dirty”) room is where you remove your PPE with the exception of your respirator. All PPE must remain in this room unless it is decontaminated. There must be containers or waste bags for your suit.

Remove your suit by **rolling the dirty side of the suit away from you.** Turn the sleeves inside out when removing your arms from the suit. Place the suit in a disposal bag or other container and proceed to the shower while wearing your respirator.

Shower Room

Showers are required on all Class I jobs and on Class II and III jobs where the exposure exceeds the PEL or where no negative exposure assessment has been done, if feasible.

The shower must meet the requirements of **29CFR1910.141.** The water temperature must be adjustable. Soap and towels must be provided. If there is a mixed crew, separate showers must be provided for men and women.



When you enter the shower, wet your entire body to control any fibers that may be on you. Take a breath and wet your face in the shower. Turn away, remove your respirator, and wet your face in the shower again. This will lessen the chance that you will breathe in any fibers that may be on your face or on the respirator.

Either clean your respirator in the shower or place it in a tub for transfer to a facility that will clean it for you. Leave the shower and enter the clean room.



Class II or III Shower

Clean Room

The clean room is where you will dress in your street clothing before leaving the job or taking a break. It is also where you will leave your street clothing while you are working. Your employer must provide lockers or other means to secure your personal belongings while you are working.

Often the clean room will only be a small room where you will put on a clean suit to wear until you get to a larger locker room. This is allowed if it can be shown that it is not practical to have the locker room next to the work area. Examples would be a very large crew, work being performed on several floors of a building, or work being done outdoors.

Entering the Work Area

To enter the work area, enter the clean room, remove your street clothing, and put on your protective clothing and respirator.

Proceed through the shower to the equipment room. Don any other protective equipment such as a hard hat and enter the work area.

Emergency Situations

The only way in or out of the work area should be through the decon area. Emergency exits may be provided. They may not be used for routine entry or exit. They are to be used only in case of an emergency such as a fire.

If you exit the work area in an emergency situation, decon as soon as possible. Do not leave the area except in cases of extreme emergency or life threatening situations. Anywhere you go will need to be decontaminated.

Waste Loadout

Anything, including waste bags, must be decontaminated before leaving the containment. **A separate decon is built for waste loadout. It usually is made up of two rooms; a wash room where the waste containers are cleaned, and a storage area where the decontaminated containers are stored for removal from the site.**

This area is also used to decontaminate any equipment before it leaves

the containment.

Additional Sanitation Facilities

Toilet Facilities

The requirements for toilet facilities are listed in **29CFR1926.51(c)**. The ratio is one toilet for every 10 workers for a standard 40 hour week. There must be separate facilities for male and female employees.

Hand and Face Washing

There should always be a location where employees can wash their hands and face before eating and before and after using toilet facilities.

While working with asbestos is a dangerous occupation if not handled properly, many other chemicals that are commonly found on many worksites are just as hazardous. Proper sanitation before eating or using toilet facilities can mean the difference between leaving the workplace healthy or contaminating yourself and others.

Emergency Stations

In addition to the sanitation facilities mentioned above, there also may be a need for emergency stations. Eyewash stations should be provided if there is a danger of debris getting in the workers' eyes. Certain chemicals used in the removal process may require the use of emergency decontamination if the chemical gets on the workers' skin or in their eyes. Know where these areas are and how to properly use them if needed.

Key Facts

Decontamination is the removal of asbestos and other contamination from you before you leave the work area.

Decontamination protects you and your family, community, and coworkers.

If you do not decontaminate properly, you can carry asbestos and other contaminants with you when you leave the work area.

The decon must contain three rooms in this order: Equipment room; Shower; and Clean Room

Your respirator is the last piece of PPE removed. It is removed in the shower.

A shower must be provided if possible.

If there is no shower, wash your hands and face before leaving the job. Shower as soon as you get home

Only enter and exit the work area through the decontamination chamber, except in emergency situations.

Usually there is a separate decon area for waste.



NOTES



CONTRACTOR/SUPERVISOR ISSUES

Pre-work Activities

Supervisors on asbestos jobs have additional responsibilities that differ from regular work sites. The following is a partial list of those responsibilities.

Inspection Report

The inspection report must be reviewed so that the supervisor is familiar with the scope of the work to be performed. The inspection report must be maintained onsite.

Materials

The materials needed for an asbestos job differ from other jobs. Cleaning supplies are constantly needed. Disposable suits must be on-hand. Negative air machines and extra filters will be needed for the duration of the job.

Notifications

Have the proper federal, state, and local agencies been notified? Are all needed permits in place?

Training

Do all workers have the needed training and certifications/licenses? Have the workers received the required medical exams and fit-testing for respirator usage.

Responsibility

Who is responsible for removing any furnishings? Has the work area been secured? What about temporary power? Is there an area for storing waste before it is transported to the disposal site? Has a trucking firm been selected to transport the waste and are they licensed? All of these matters and others need to be addressed before the job starts.

Insurance

Contractors performing asbestos abatement need several types of

insurance. The different insurances protect the contractor if there is an accident or property damage associated with the work being performed.

Workers Compensation

Workers Compensation insurance **is designed to provide income for a worker who suffers an injury or illness associated with the job.** The money is paid into a fund for the worker, and the worker cannot hold the employer liable for the injury/illness.

General Liability

General Liability insurance **is designed to protect the employer from claims of personal property damage or injuries by non-employees associated with the work being performed.**

Professional Liability/Errors and Omissions

This type of insurance **is designed to protect the employer if decisions are made by the contractor or other professionals that result in extended completion dates, personal injury, or facility damage.** This insurance is usually purchased by project designers, building inspectors, and industrial hygienists.

Claims Made/Occurrence

Asbestos abatement has its own **special health hazards.** To protect workers from the **financial hardship** associated with these hazards, employers often carry a special type of insurance.

Claims-Made Insurance

...covers the worker if the claim is made while the **policy is still in effect.**

Occurrence Insurance

...covers the worker if the incident happened **during the time that the policy was in effect.**

Bonding

Another type of insurance that contractors carry is called a bond. **A bond is a type of insurance that ensures that the work will be completed.** Costs for bonding may either be based on the cost of the project for larger jobs or a flat fee for smaller jobs. Bonds are divided into three types: Bid; Performance; and Payment.

Bid

A Bid Bond **ensures that the contractor is capable of performing the work on time, within budget, and satisfactory workmanship.**

Performance

A Performance Bond **ensures that the job will be completed even if the original contractor fails to do so.** Performance bonds pay for an additional contractor to finish the work if the original contractor does not.

Payment

A Payment Bond ensures that the contractor will have the funding to complete the job. This is similar to the Performance Bond, except that it provides the contractor with funding if the facility owners miss payments for work completed.

Liability

There are three types of legal responsibility (liability) that contractors face on asbestos work sites. They are: regulatory, criminal, and civil.

Regulatory

Regulatory liability **is failure to comply with applicable federal, state, and local regulations.** These regulations include safety issues, the way that work is performed, and the way that the waste is disposed of. Penalties for failure to follow these regulations may result in fines or having licences revoked.

Civil

Civil liability **involves disputes between private parties.** Examples may include: failure to fulfill the terms of the contract;

disagreement of contract terms; or material and workmanship quality.

If any of the above result in an injury or damage, the actions can be considered “tort liability”.

Criminal

If the contractor willingly violates the laws that govern asbestos jobs, and that violation results in injury or death, the contractor can be held criminally liable. Willful violations can result in fines, imprisonment, or both.

Contract Specifications

A Contract Specification is a written document that details how the work is to be done. It lists detailed requirements concerning:

- | | |
|--|---|
| <input type="checkbox"/> Bid Forms | <input type="checkbox"/> Submittals and notices |
| <input type="checkbox"/> Qualifications & experience | <input type="checkbox"/> Materials & equipment |
| <input type="checkbox"/> Insurance requirements | <input type="checkbox"/> Respiratory protection |
| <input type="checkbox"/> Scope of work | <input type="checkbox"/> Air monitoring |
| <input type="checkbox"/> Payment schedule | <input type="checkbox"/> Waste disposal |
| <input type="checkbox"/> Health & Safety issues | <input type="checkbox"/> Terms & conditions |
| <input type="checkbox"/> Meeting schedules | <input type="checkbox"/> Material replacement |
| <input type="checkbox"/> Security | <input type="checkbox"/> Tool and equipment storage |
| <input type="checkbox"/> Use of utilities | <input type="checkbox"/> Modifications or change orders |

Contract specifications must be job specific. Job-specific issues must be addressed. The issues included will change from job to job. Using a general specification form will miss many of the issues that need to be included.

When developing contract specifications, outside professionals are included in the process. Architects, engineers, legal experts, and industrial hygienists are often included in the process for their expertise.

Recordkeeping

All asbestos jobs create a large amount of records. Keeping good records is a very important part of any supervisor. Accurate records are the best defense should conflicts arise. Records are also important for regulatory compliance, public relations, and quality control. They are useful in estimating and bidding future projects.

There are different requirements for recordkeeping depending on the governmental agency involved. Understanding and following these requirements is a vital part of the supervisory portion of the job.

OSHA

Employers are responsible for maintaining the following records under OSHA law.

Exposure Assessment

Worker exposures must be kept for 30 years plus employment. These records include: date of measurement; work task being performed; sampling method used; number, duration, and results of the sampling; type of PPE being used; and the name, SS#, and exposure results of the affected employees.

Medical Surveillance

All medical records must be kept for 30 years plus employment. These records include: name and SS#; medical exam results, including history, questionnaire responses, exam results, and physician recommendations. If exposures are above the levels that are considered safe, these monitoring results become part of the medical records.

Employees or their representatives have the right to get copies of their medical records when they leave the job. It is recommended that they do so. These records are for your protection. Keep them in a safe place. You or you family may need them in the future.

Training

All training records of employees must be kept for one year

after the last day of employment.

Identification, Location, and Quantity of ACM or PACM

Any records of asbestos containing materials, their location, and the method used to determine the findings must be kept by the owner of the facility for as long as they maintain ownership. If the building is sold, these records are transferred to the new owner.

If any tests have been done to prove that materials do not contain asbestos, they must also be kept and transferred to the new owners.

Records Transfer

All of these records must be made available to OSHA or NIOSH if requested. If the employer goes out of business, all records must be transferred to NIOSH.

EPA

The Environmental Protection Agency also requires certain records to be kept and maintained. The National Emissions Standard for Hazardous Air Pollutants (NESHAP) lists these requirements.

A Waste Shipping Record (manifest) must be kept for all shipments of asbestos waste. The landfill operator receives this manifest.

Within 35 days, the landfill operator must return a copy of the manifest to the generator (contractor). If the generator does not receive the copy, they must contact the landfill operator to determine the status of the shipment.

If the shipment cannot be tracked within 45 days, the EPA must be notified by an exception report.

AHERA

Asbestos abatement in schools have additional recordkeeping rules to follow. These records must be maintained for all asbestos work performed in schools.

- △ Each preventative measure or response action.
- △ Results of any air sampling.
- △ Training records for anyone involved in abatement or O&M.
- △ Results of periodic inspection of asbestos being managed in place.
- △ Any clean-up involving ACM.
- △ Any O&M activity.
- △ Any maintenance involving ACM.
- △ Any fiber release episode.

Key Facts

An asbestos job takes a lot of planning. There are many considerations that are not found on regular jobs.

Asbestos jobs create a large amount of paperwork.

Maintaining accurate records will aid in:

- **Reducing liability in proving that all regulations were complied with.**
- **Proving that the work was done properly.**
- **Lowering insurance costs.**
- **Marketing the company to earn additional contracts.**

In addition, it is a good idea to keep a personal journal documenting events that occurred during the job and how they were resolved. If you are required to defend your actions, this journal will detail exactly how incidents were handled.

ASBESTOS ABATEMENT CHECKLIST SUPERVISORY CHECKLIST

This checklist should be considered only a guideline for project management and reviewed to understand the scope and responsibility a supervisor takes on when he or she agrees to manage an asbestos abatement project.

Notification Given To:	Yes	No	Comments
EPA			
State Agency(s)			
1. Preparation of the Regulated Area			
Warning Signs posted			
<input type="checkbox"/> Barrier tape and/or <input type="checkbox"/> plastic fencing erected			
Contractor License posted			
<input type="checkbox"/> EPA notification and/or <input type="checkbox"/> State notification posted			
Site Safety and Health plan available			
Emergency phone numbers posted			
Emergency evacuation plan posted			
Written Hazcom program available			
Written Respiratory Protection Program available			
Decon erected w/taped directional evacuation →			
Decon contiguous to the regulated area			
Lockers available for street clothes			
Lock box(s) for personal valuables			
Shower has hot and cold water			
Towels, soap, and shampoo available			

1. Preparation of the Regulated Area – cont'd	Yes	No	Comments
Sanitary conditions in shower maintained			
Disposal bin for disposable coveralls			
Disposal bag for filters			
Container for respirators for sanitizing			
Plan for Decon utilization - M/F			
HVAC shut down and locked out			
Holder of HVAC lockout key is:	Name:		
HVAC filters discarded as ACM waste			
Interior surfaces of the HVAC duct work deconed			
Critical openings pre-cleaned and sealed			
Regulated Area pre-cleaned			
2 layers of 6 mil poly on the floor and up wall - 12"			
Poly on walls per state regulation or best practice			
First wall layer starts approx. 12" from ceiling			
Seams between layers overlapped at least 6"			
Taped directional evacuation → 1' above floors			
Optional smoke testing of containment			
Entrance to Regulated Area locked at night			
Electrical system <input type="checkbox"/> shut off and <input type="checkbox"/> locked out			
Temporary electrical service w/GFCIs established			
Temporary low-voltage lights			
Light Fixtures cleaned			
Light fixtures <input type="checkbox"/> sealed and removed			
Holder of electrical lockout key is:	Name:		
Moveable items pre-cleaned			

1. Preparation of the Regulated Area – cont'd	Yes	No	Comments
Moveable items removed from the regulated area			
Stationary items pre-cleaned			
Stationary items sealed with poly critical barriers			
NAMs set up			
# of NAMS set up			
Adequate supply of □1 st and □2 nd pre-filters			
At least 4 air changes an hour in containment			
-0.02 pressure maintained in containment			
Manometer calibrated daily			
Manometer checked at least hourly			
Only HEPA vacuums are used			
Adequate supply of □1 st and □2 nd pre-filters			
# of personnel in the containment	#		
# of visitors in the containment	#		
Workers certifications current			
Supervisors certifications current			
Competent Person	Name:		
Respiratory Program Administrator	Name:		
CPR current trained person	Name:		
First Aid current trained person	Name:		
Name of company conducting employee exposure air sampling	Name:		
Name of monitoring tech(s) performing testing	Name(s):		

1. Preparation of the Regulated Area – cont'd	Yes	No	Comments
All air sampling data is being provided <input type="checkbox"/> in writing and <input type="checkbox"/> in a timely manner			
Name of company conducting air sampling outside the regulated area/containment	Name:		
All air sampling data is being provided <input type="checkbox"/> in writing and <input type="checkbox"/> in a timely manner			
Medical records current			
Log 300 current			
2. Personal Protective Equip & Respirators	Yes	No	Comments
Personnel trained in <input type="checkbox"/> PPE and <input type="checkbox"/> Respirators			
NIOSH – approved respirators in use			
Personnel medically approved to wear respirators			
Personnel <input type="checkbox"/> Qualitative <input type="checkbox"/> Quantitatively Fit-tested			
Respirator brand, model, and sizes – APR/PAPR			
Respirator brand, model, and sizes – Type C PP/PD			
Breathing Air quality for Type C checked by	Name:		
Type(s) of filters used: <input type="checkbox"/> HEPA; <input type="checkbox"/> Organic, <input type="checkbox"/> Combo			
Non-alcohol wipes for personal cleaning			
Multiple wash & rinse respirator sanitizing station			
Proper storage area for respirator storage			
Stocked respirator repair kit for each brand & model			
Modesty <input type="checkbox"/> tops and/or <input type="checkbox"/> bottoms provided			
Hooded Tyvek® and/or Saranek® suits provided			
Protective <input type="checkbox"/> boot covers or <input type="checkbox"/> boots provided			
<input type="checkbox"/> Latex or <input type="checkbox"/> Nitrile surgical gloves provided			
<input type="checkbox"/> Cotton, <input type="checkbox"/> Leather, &/or <input type="checkbox"/> Kevlar gloves provided			

2. Personal Protective Equip & Respirators	Yes	No	Comments
Duct tape			
Hard hats			
Goggles			
Hearing loss protection			
Personnel in PPE checked for jewelry and cosmetics			
3. Work Practices	Yes	No	Comments
Daily Log Book maintained			
Quality of work in the containment checked by a supervisor at least 4 times a shift			
Personnel enter the Clean Room of the Decon and don their PPE, respirator, and filter(s)			
Personnel pass through the Shower Room on their way to the Equipment Room			
Personnel enter the Equipment Room of the Decon and may put on outer <input type="checkbox"/> boots, <input type="checkbox"/> gloves and <input type="checkbox"/> hard hats as needed and then enter the regulated area or containment			
Wet methods with <input type="checkbox"/> Amended water with <input type="checkbox"/> low pressure sprayers are used			
Excess water build-up is removed quickly			
Debris on <input type="checkbox"/> floor and <input type="checkbox"/> scaffolds keep to a minimum – cleanup is almost immediate			
Waste is bagged or wrap while damp/wet			
Waste is carefully lowered in bags or sent down covered chutes from heights 10' or greater			
Containment checked at the end of each shift for quality of cleanup			

3. Work Practices cont'd	Yes	No	Comments
Personnel are not allowed to eat, smoke, chew products, or drink in the containment			
Tools are insulated against electric shock			
Tools are properly stored in the containment when not in use			
Broken or worn tools replaced at shift's end			
Tools are properly cleaned prior to removal from the work area			
<input type="checkbox"/> Wooden and/or <input type="checkbox"/> fiberglass ladders are used in the containment			
Scaffolds over 10' high have guardrails and toeboards			
Personnel HEPA vacuums PPE before entering Equipment Room of decon			
Personnel properly remove contaminated PPE in the Equipment Room of the Decon and put them in disposal containers there			
Personnel properly removes filters and rinses respirators while still on face in the Shower Room of the Decon and place filters and respirators in containers			
Personnel in the Clean Room of the Decon change into street clothes or modesty clothing and exit the Decon			
A final visual inspection is done by a supervisor prior to clearance air sampling			
A final visual inspection is done by a third party consultant prior to clearance air sampling			
Critical barriers in place during final clearance air sampling			

3. Work Practices cont'd	Yes	No	Comments
Visual inspection conducted by an inspector prior to repainting/encapsulation/removal/replacement			
Following removal of critical barriers, all surfaces in contact with the barriers are inspected to ensure that no surface contamination is visible			
4. Disposal	Yes	No	Comments
6 mil poly disposal bags are used			
Waste is double bagged or double wrapped			
Decon <input type="checkbox"/> shower filters and <input type="checkbox"/> filtered water waste are disposed of as asbestos waste			
Bags are filled no more that half-full, at most			
Bags are goose-necked			
Outside disposal bag is labeled			
Bags are cleaned (<input type="checkbox"/> rinse; <input type="checkbox"/> HEPA vacuumed) in the containment area before transfer to the waste load-out area			
Disposal bags containing sharp-edged material are packed in a labeled cardboard or metal drum			
Bags and/or metal drums are <input type="checkbox"/> rinsed and/or <input type="checkbox"/> HEPA vacuumed in waste load-out area before leaving the containment			
Disposal bags and drums are handled carefully			
Waste bags and/or drums are stored in a secure area (dumpsters or a locked room) until loaded on a placarded/labeled disposal truck			
Waste hauler has <input type="checkbox"/> proper and current licenses, <input type="checkbox"/> forms to document waste pickup and deposit at a <input type="checkbox"/> proper landfill, and <input type="checkbox"/> verification of delivery form for supervisor's records + NESHP record			

Glossary

Terms in CAPITALS are defined in the glossary.

ABATEMENT	Lessening the HAZARD of ASBESTOS. Includes ENCAPSULATE, ENCLOSE, REPAIR, and remove ASBESTOS.
ACM	Asbestos-Containing Material.
ADEQUATELY WET	ASBESTOS is "adequately wet" when it is wet enough so that no particles are released. Surfactant is used to adequately wet asbestos. One indication of this (but not the only one) is no visible emissions.
AGGRESSIVE SAMPLING	A way of taking AIR SAMPLES where the air is stirred up using fans and leaf blowers. Aggressive sampling is used for CLEARANCE AIR SAMPLES.
AHERA	The Asbestos Hazard Emergency Response Act- The EPA law covering ASBESTOS in schools.
AIRLOCK	An empty room in some DECONs. Workers pass through the flapped doors one at a time. Air cannot move through the airlock.
AIR - PURIFYING RESPIRATOR	Protective equipment. A face mask with filters that you wear. It filters or purifies the air in the work area. APR
AIR SAMPLES	Measuring the amount of ASBESTOS in the air using a pump.
AIR-SUPPLIED RESPIRATOR	Protective equipment. A face mask with a hose. It supplies clean air to you from outside the work area. SAR
ALVEOLI	Tiny air sacs found in your lungs. They are important areas where oxygen enters your body.

AMENDED WATER	Water plus a chemical called SURFACTANT. Amended water soaks into ASBESTOS faster than plain water.
AREA AIR SAMPLE	An AIR SAMPLE taken from one spot in a room.
ASBESTOS	A natural mineral used for insulation in many buildings. Asbestos breaks into FIBERS. It causes lung cancer and other diseases.
ASBESTOSIS	A disease caused by ASBESTOS. It is the scarring of the lungs, also known as white lung.
ATTENDANT	A worker stationed outside a CONFINED SPACE to monitor what's going on inside.
B READER	A doctor who has had special training and has been certified to identify signs of occupational diseases on X-rays.
BRONCHI	A branch off the windpipe where air travels to your lungs.
BULK SAMPLE	A chunk of material which is sent to a lab to test for ASBESTOS.
CANCER	A large group of diseases where cells grow abnormally, rapidly, and out of control.
CARBON MONOXIDE	A colorless, odorless, and tasteless poisonous gas.
CARTRIDGE	A filter used on an AIR-PURIFYING RESPIRATOR.
CATEGORY I NON-FRIABLE ACM	ASBESTOS – containing gaskets, resilient floor covering, and asphalt roofing products containing more than one percent of asbestos as determined by using a PLM.
CATEGORY II NON-FRIABLE ACM	All NON-FRIABLE materials that are not Category I non-friable ACM.

CILIA	Very tiny hairs that line the walls of your windpipe and BRONCHI. They beat rapidly and move mucus up your windpipe to remove objects from your respiratory system.
CLEAN ROOM	The last room in the DECON (going out). Clean suits, sanitized respirators, and street clothes are stored here.
CLEARANCE AIR SAMPLE	An AREA AIR SAMPLE taken at the end of the job. It tells the building owner whether the room is clean enough.
COMPETENT PERSON	In the OSHA regulations, a trained supervisor who makes sure that rules are followed and equipment works on the job.
CONFINED SPACE	A space that has the following characteristics: 1) limited openings for entry and exit, 2) inadequate natural air flow, and 3) not designed to be worked in continuously.
CONTAINMENT	Isolating the work area from the rest of the building. Usually done by putting POLY on the walls and floors and using a NEGATIVE AIR MACHINE. This keeps ASBESTOS FIBERS inside the work area.
CONTINUOUS-FLOW AIR -SUPPLIED RESPIRATOR	An AIR-SUPPLIED RESPIRATOR that has a constant amount of air which is supplied to you. It will not give you more air if you need it.
CONTRACT SPECIFICATIONS	See SPECS.
CONTROL METHODS	Ways of controlling ASBESTOS. Includes: ENCAPSULATE, ENCLOSE, REPAIR, remove, and O&M.
COSH	Committee on Occupational Safety and Health-A community based group which helps workers with health and safety problems on the job.

CUBIC CENTIMETER	A space about the size of a sugar cube. Asbestos in the air is measured in FIBERS per cc.
DECON	Decontamination unit or area – A shower unit. The decon has three rooms: DIRTY ROOM, shower and CLEAN ROOM. Everyone must enter and leave the work room through the decon.
DEMAND-ONLY RESPIRATOR	AIR-SUPPLIED RESPIRATOR which always goes into a NEGATIVE PRESSURE before it supplies you the air that you need. This is not a respirator used for ASBESTOS ABATEMENT work.
DEMOLITION	The wrecking or taking out of a load-supporting building part and any related handling operations or the intentional burning of a facility.
DIRTY ROOM	The first room in the DECON (going out). Workers take their suits off in the dirty room on their way to the shower. Dirty hard hats and tools are also stored here. Also Equipment Room
DOSE	The amount of a substance that you take, or are exposed to, at a specific time.
DOSE-RELATED	A relationship between the amount of a substance you are exposed to and the reaction you have to that exposure.
DUCT TAPE	Sticky, often silver tape. Used to attach POLY.
DUST MASK	A face mask that has no seal to your face. It is not legal for ASBESTOS work. It does not protect you.
ELECTRON MICROSCOPE	A microscope which beams electrons (instead of light) at a sample. Electron microscopes blow up images much larger than LIGHT MICROSCOPEs.
ENCAPSULANT	A sticky paint used to ENCAPSULATE ASBESTOS
ENCAPSULATE	To cover ASBESTOS with a sticky paint. A way to control ASBESTOS without removing it.

ENCLOSE	To build an air-tight box around ASBESTOS. A way to control ASBESTOS without removing it.
ENGINEERING CONTROLS	Ways of controlling workplace hazards by building barriers, ventilation, etc. Must be done before RESPIRATORS may be used.
ENVIRONMENTAL PROTECTION AGENCY	See EPA.
EPA	Environmental Protection Agency – A U .S. government agency that protects against pollution.
EQUIPMENT ROOM	See DIRTY ROOM.
EXPOSURE	Not protected. If you are in a work area with ASBESTOS fibers in the air and you do not have on the right RESPIRATOR, you are exposed to ASBESTOS.
F/CC	FIBERS per CUBIC CENTIMETER of air – ASBESTOS is measured this way. Air is pumped across a filter. The number of FIBERS are counted. The amount of air is measured in CUBIC CENTIMETERS.
FIBER	A single strand of ASBESTOS. ASBESTOS fibers are so small they are invisible.
FIBROSIS	A disease where scar tissue is formed in the connective tissue of the lungs.
FRIABLE	Crumbly – Friable ASBESTOS can be crumbled by hand pressure.
FULL-FACE RESPIRATOR	A face mask that covers the full area of your face, from the hair line of your forehead to your chin.

GLOVE BAG	A 3-foot by 4-foot plastic bag with gloves built into it. The top of the bag is sealed around a pipe. The work is done inside the bag. Used for maintenance work only.
GRADE D AIR	Air for an AIR-SUPPLIED RESPIRATOR. Grade D air has chemicals, oil, and water filtered out so that it is safe to breathe.
GFI	Ground Fault Interrupter – A sensitive circuit breaker for tools and extension cords. A GFI will stop a current before it can stop a worker's heart.
HALF-MASK RESPIRATOR	A face mask that covers half of your face. It covers your nose and mouth from the bridge of your nose to your chin. These are difficult masks to fit.
HAZARD	A danger or a risk.
HEAT EXHAUSTION	An illness caused by working in a hot area. A medical alert.
HEAT STROKE	An illness caused by working in a hot area. A medical emergency – the worker's body cannot cool itself.
HEPA FILTER	High Efficiency Particulate Air filter – A filter that is fine enough to trap ASBESTOS FIBERS in the air. HEPA filters are used in RESPIRATORS, HEPA VACUUMs, and NEGATIVE AIR MACHINES.
HEPA VAC	HEPA – equipped vacuum cleaner – A vacuum cleaner which filters air through a HEPA filter.
HVAC SYSTEM	Heating, Ventilating, and Air Conditioning system- Usually a central heating and cooling system that blows air through ducts.
IH	See INDUSTRIAL HYGIENIST.

INDUSTRIAL HYGIENIST	A scientist who knows how to control workplace health and safety HAZARDS. An industrial hygienist usually takes air samples and inspects ASBESTOS jobs.
LATENCY PERIOD	A time gap between when you are exposed to a HAZARD and when you have signs and symptoms of disease. For example, if you breathe ASBESTOS today you may get ASBESTOSIS in 20 years. The latency period for most asbestos diseases is 10 – 40 years long.
LEAK- TIGHT	Sealed so that solids or liquids cannot escape or spill out. It also means dust-tight. Six mil poly waste bags or sealed drums are examples of items that could be considered leak tight.
LIGHT MICROSCOPE	A microscope which shines light on a sample. Light microscopes cannot blow up images as large as ELECTRON MICROSCOPES. POLARIZED LIGHT MICROSCOPES (PLMs) and PHASE CONTRAST MICROSCOPES (PCMs) are light microscopes.
LOCAL EXHAUST VENTILATION	Hooking up a vacuum or air duct right at the place where work is being done (for example, on a power tool). This is different from general ventilation – bringing fresh air into a room.
LOCKDOWN	A sticky sealant which is sprayed on beams, decks, ceilings, etc. after ASBESTOS is cleaned off. Lockdown seals in any invisible FIBERS that weren't cleaned up.
LOCKOUT/TAGOUT	LOCKOUT is putting a lock on the electrical box during ASBESTOS work or CONFINED SPACE work so that no one will turn the power on by accident. TAGOUT is putting up a warning sign explaining why the power box is locked.

LUNG CANCER	A disease which is a CANCER of the lung. It is an abnormal growth of cells in the lung tissue, usually growing in the BRONCHI.
MATERIAL SAFETY DATA SHEET	MSDS – A chemical fact sheet. Your employer must train you how to use Material Safety Data Sheets.
MAXIMUM USE LEVEL	The highest amount of asbestos a respirator can handle and protect you against.
MEDICAL EXAM	An exam given by a doctor to check your health.
MESOTHELIOMA	A disease caused by ASBESTOS. It is a CANCER of the lining of the lungs or the lining of the stomach and digestive system.
MSDS	See MATERIAL SAFETY DATA SHEET.
NEGATIVE AIR MACHINE	A heavy-duty fan with HEPA filters in it. All the air that leaves the work room is pulled through the negative air machine.
NEGATIVE AIR PRESSURE	When a NEGATIVE AIR MACHINE is running, the air pressure inside the work room is less than the air pressure outside the work room. ASBESTOS cannot leak out of the work room.
NEGATIVE PRESSURE SEAL CHECK	A test to check the seal of your RESPIRATOR to make sure that it is fitted to your face so that there are no leaks for fibers to get in. You use NEGATIVE PRESSURE for this check. It is a check you must do each and every time that you put on your RESPIRATOR.
NEGATIVE PRESSURE RESPIRATOR	A face mask (RESPIRATOR) that works by using NEGATIVE PRESSURE to seal the face piece to the face. NEGATIVE PRESSURE means that there is less air pressure inside the face mask than outside the face piece.

NESHAP	The National Emission Standards for Hazardous Air Pollutants. An EPA regulation for ASBESTOS.
NIOSH	The National Institute for Occupational Safety and Health – A U.S. government agency that researches worker safety and health. NIOSH recommends changes in the regulations to OSHA. NIOSH also approves respirators.
NON-FRIABLE	ASBESTOS that cannot be crumbled by hand pressure.
O&M PLAN	Operations and Maintenance Plan – A plan for controlling the ASBESTOS that remains in a building. This plan includes: <ol style="list-style-type: none"> 1) Where the asbestos is found in the building. Many asbestos materials should be labeled. 2) The amount of training that workers must receive to work with the material. 3) The permits which must be obtained before working with asbestos. 4) Accepted ways to work with asbestos safely. This includes equipment, worker protection, and medical exams. 5) When and how to check the condition of asbestos materials and record any changes.
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	See OSHA.
OSHA	The Occupational Safety and Health Administration – A U.S. government agency that covers worker safety and health on the job.
OSHA STANDARD	An OSHA regulation, for example, the OSHA Asbestos Standard.
OXYGEN-DEFICIENT ATMOSPHERE	An atmosphere containing an oxygen level less than 19.5 percent.

PAPR	Powered Air Purifying Respirator – An AIR – PURIFYING RESPIRATOR (a face mask with a filter) that has a pump. This pumps air through the filter to the face piece. It is a POSITIVE PRESSURE RESPIRATOR You can request a PAPR whenever a NEGATIVE PRESSURE RESPIRATOR is required by law.
PCM	Phase Contrast Microscope – The microscope used to count ASBESTOS FIBERS from PERSONAL AIR SAMPLES. PCM is sometimes used for AREA AIR SAMPLES.
PEL	Permissible Exposure Limit – The PEL is 0.1 fibers per cubic centimeter over an 8-hour day. This is OSHA' s legal limit on how much ASBESTOS you may be exposed to.
PERMISSIBLE EXPOSURE LIMIT	See PEL.
PERSONAL AIR SAMPLE	An AIR SAMPLE taken in a worker's breathing area. This is an accurate measure of how much asbestos the worker was EXPOSED to. Personal air samples are taken on a few workers every day.
PFT	See PULMONARY FUNCTION TEST.
PHASE CONTRAST MICROSCOPE	See PCM.
PLEURA	A two-layered lining of the chest area. It wraps around the lungs and the inside of the rib cage.
PLM	Polarized Light Microscope – The microscope used to look at BULK SAMPLES.
POLARIZED LIGHT MICROSCOPE	See PLM.

POLY	Polyethylene sheet plastic – Sheet plastic that is taped to walls and floors to protect them from ASBESTOS while work is going on.
POSITIVE-PRESSURE Seal CHECK	A test to check the seal of your RESPIRATOR to your face. You check for leaks by testing the fit with POSITIVE PRESSURE. You make the POSITIVE PRESSURE by blowing into the mask.
POSITIVE-PRESSURE RESPIRATOR	A face mask that has more air pressure inside the mask than outside the mask. These RESPIRATORS are more protective than the NEGATIVE PRESSURE RESPIRATORS. With POSITIVE PRESSURE the air leaks from the inside to the outside.
POWERED AIR PURIFYING RESPIRATOR	See PAPR.
PRESSURE-DEMAND AIR-SUPPLIED RESPIRATOR	A face mask with air supplied to the mask through a hose. The amount of air that is supplied to you is exactly what you "demand." There is a regulator that senses the amount of air that you need to breathe.
PROTECTION FACTOR	PF – The degree of protection of a RESPIRATOR. The Protection Factor is determined in a laboratory.
PULMONARY FUNCTION TEST	A breathing test to see how well your lungs are working. It measures how much air you can breathe in and out. It can tell you if there is a problem with your lungs.
QUALITATIVE FIT TEST	A test that tells you if you have any leaks in your RESPIRATOR. You are tested by someone who follows the OSHA procedure. If you smell or taste the testing substance, you have a leak and the respirator does not fit. You must have a qualitative fit test for any NEGATIVE PRESSURE RESPIRATOR that is issued to you.

**QUANTITATIVE
FIT TEST**

A test that tells you if you have any leaks in your RESPIRATOR. It is a very accurate test. It uses a probe to determine the amount of testing agent outside the mask and the amount inside the mask. It gives you the personal PROTECTION FACTOR which that mask has for you.

RACM

Materials covered by the NESHAP regulations:
1) FRIABLE ASBESTOS material,
2) CATEGORY I NON-FRIABLE ACM that will or has become FRIABLE, or
3) CATEGORY II NON-FRIABLE ACM that has a high probability of becoming or has become FRIABLE during demolition or renovation.

**REGULATED
ASBESTOS
CONTAINING
MATERIAL**

See RACM.

RENOVATION

Changing a building or one or more building parts in any way, including the stripping or removal of RACM. (Operations whereby load-supporting building parts are wrecked or taken out are DEMOLITIONS.)

REPAIR

Putting a patch on ASBESTOS pipe insulation. A way to control ASBESTOS without removing it.

RESPIRATOR

A face mask used to protect you. It either filters your breathing air or supplies you with clean breathing air.

SCBA

Self-Contained Breathing Apparatus – A positive pressure, pressure demand AIR- SUPPLIED RESPIRATOR for which you carry the air supply in a tank.

SPECS

Contract specifications – A written plan for the job that the building owner writes. The contractor must follow the specs.

SPRAYBACK	New insulation put up after ASBESTOS is removed and the job passes the CLEARANCE AIR SAMPLE.
SURFACTANT	A chemical added to water to make it soak into ASBESTOS faster. Surfactant makes water wetter.
TAGOUT/ LOCKOUT	LOCKOUT is putting a lock on the electrical box during ASBESTOS work or CONFINED SPACE work so that no one will turn on the power source by accident. TAGOUT is putting a tag on the box explaining why the power box is locked.
TEM	Transmission Electron Microscope -- The microscope used to count ASBESTOS from CLEARANCE AIR SAMPLES.
TRANSMISSION ELECTRON MICROSCOPE	See TEM.
TIME WEIGHTED AVERAGE (TWA)	A method of determining fiber counts for an eight hour work period by averaging shorter sampling periods together.
TYPE C RESPIRATOR	An AIR-SUPPLIED RESPIRATOR.
WHITE BLOOD CELLS	A part of the body's defense system against outside substances. They attack foreign objects like bacteria or ASBESTOS.
WORK HISTORY	A part of your medical exam. You list what you have worked with, when and where. This helps the doctor look for job-related diseases that you might have.
WORK PRACTICES	Ways of doing work that affect how safe it is. For example, keeping ASBESTOS wet is a good work practice. It keeps ASBESTOS out of the air.

**SUMMARY OF
OSHA ASBESTOS STANDARD
29CFR1926.1101**

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(a) Scope and Application

(b) Definitions

Asbestos is defined as including chrysotile, amosite, tremolite asbestos, anthophyllite asbestos, and actinolite asbestos. In addition, **presumed asbestos containing material (PACM)** is also treated as asbestos. PACMs include **thermal system insulation (TSI)** and surfacing material found in buildings constructed no later than 1980.

Negative Exposure Assessment is defined as a demonstration by the employer that employee exposure during an operation is or will be consistently below the PELs.

Activities involving exposure to ACMs and PACMs have been divided into four classifications. They are as follows:

Class I asbestos work means activities involving the removal of TSI and surfacing ACM and PACM.

Class II asbestos work means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos containing wallboard, floor tile and sheeting, roofing and side shingles, and construction mastics.

Class III asbestos work means repair and maintenance operations, where ACM is likely to be disturbed.

Class IV asbestos work means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM, and activities to clean up dust, waste, and debris result from Class I, II, and III activities.

(c) Permissible Exposure Limits

Permissible Exposure Limit (PEL) – The employer must ensure that no employee is exposed to airborne concentrations of asbestos greater than **0.1 f/cc** as measured over an eight hour time period.

Excursion Limit (EL) – The employer shall ensure that no employee is exposed to an airborne concentration of asbestos greater than **1.0 f/cc** as measured over a 30 minute period.

(d) Multi-employer Worksites

On multi-employer worksites, **an employer performing work requiring the establishment of a regulated area shall appropriately inform all other employers.**

Employers of employees working adjacent to regulated areas must take measures on a daily basis to ensure that their employees are not being exposed to asbestos fibers. All general contractors are responsible for ensuring that the asbestos contractor is in compliance with the standard.

(e) Regulated Areas

All Class I, II, and III work must be conducted within regulated areas. Other operations must be conducted within regulated areas whenever airborne concentrations of asbestos exceed the PEL. Regulated areas must comply with the following requirements:

Demarcation – Critical barriers, negative-pressure enclosures, and signs may all serve to demarcate the regulated area.

Access – Only authorized persons shall enter regulated areas.

Respirators – When respirators are required, all persons entering a regulated area must be supplied appropriate respirators.

Prohibited Activities – The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated area.

Competent Persons – The employer shall ensure that all asbestos work performed within regulated areas is supervised by a competent person.

(f) Exposure Assessments and Monitoring

1. General Monitoring

Employee exposure shall be determined from breathing zone air samples that are representative of the 8-hour and 30-minute exposures of each employee.

2. Initial Exposure Assessment

- i. competent person shall conduct all exposure assessment immediately before or at the initiation of the operation to ascertain expected exposures.
- ii. Unless a negative exposure assessment has been made, the initial exposure assessment shall be based on monitoring results. **For Class I work, the employer shall presume that employees are exposed in excess of the TWA and excursion limit until monitoring results or a negative exposure assessment document that the employees on the job will not be exposed in excess of the PEL.**
- iii. **Negative exposure assessment can be determined by:**
 - A. objective data demonstrating that exposures cannot exceed the PEL/EL;
 - B. data obtained from previous similar jobs within the last 12 months; or

C. results of initial exposure monitoring.

3. Periodic Monitoring...

- i. **Class I and II work – daily monitoring** is required unless negative exposure assessment.
- ii. **Non-Class I and II work – periodic monitoring** where exposures are expected to exceed the PEL/EL.
- iii. **Exception to monitoring** – when all employees are wearing supplied air respirators operated in the pressure-demand mode.

4. Termination of Monitoring...

- i. allowed if statistically reliable results of monitoring show exposure levels to be below the PEL/EL.
- ii. disallowed whenever there has been a change in process, control equipment, personnel, or work practices that may result in increased levels of exposure.

5. Employee Notification of Monitoring Results...

- i. employees shall be notified as soon as possible as to monitoring results.
- ii. notification shall be done in writing either individually or by posting at a centrally located place that is accessible to affected employees.

6. Observation of Monitoring...

- i. employees and their representatives have the right to observe any monitoring.
- ii. observers shall be provided with and required to wear any protective clothing and equipment applicable.

(g) Methods of Compliance

1. The following **engineering controls** and work practices are required for all ACM work, regardless of levels of exposure.

- i. HEPA-vacuums.
- ii. use of **wet methods** except where such methods create a greater hazard.
- iii. prompt clean-up and disposal of waste in leak-tight containers except in some roofing operations.

2. In order to meet the PEL/EL, the following **control methods** are also required.

- i. HEPA equipped local exhaust ventilation.
- ii. enclosure/isolation of the work area.
- iii. ventilation of the regulated area.
- iv. other feasible work practices and engineering controls.
- v. respirators to be used as supplemental measure.

3. Prohibitions...

- i. high-speed abrasive disc saws not equipped with ventilator, or enclosures without HEPA filtered air.
- ii. compressed air, unless used in conjunction with an enclosed ventilation system designed to capture the dust cloud created.
- iii. dry sweeping, shoveling, or other dry clean-up methods.

iv. employee rotation as a means of reducing employee exposure.

4. Class I Requirements...

i. all work must be supervised by a competent person.

ii. One of the following methods must be used to assure airborne fibers do not migrate from the regulated area.

A. critical barriers placed over all openings to the regulated area except in outdoor situations.

B. other verifiable barrier or isolation methods.

iii. HVAC systems shall be isolated in the regulated area by sealing with a **double layer of 6 mil plastic.**

iv. impermeable dropcloths shall be placed beneath all removal activity.

5. Specific Control methods for Class I Work...

i. **Negative Pressure Enclosure (NPE) systems** shall be used whenever feasible.

A. Specifications...

1. NPE may be of any configuration.

2. **minimum of 4 air exchanges per hour.**

3. minimum of -0.02 column inches of water pressure differential must be maintained.

4. NPE shall be kept under negative pressure at all times.

5. air shall be ventilated away from employees toward HEPA device.

B. Work Practices...

1. NPE shall be inspected for breaches and smoke-tested for leaks before beginning work and at the beginning of each shift.

2. electrical circuits in the enclosure shall be deactivated, unless equipped with **ground-fault circuit interrupters.**

ii. **Glovebag Systems** shall be used for removal from straight runs of piping and elbows and other connections.

A. Specifications...

1. glovebags shall be made of 6 mil plastic and shall be seamless at the bottom.

2. glovebags used on elbow and other connections must be designed for that purpose.

B. Work Practices...

1. glovebag shall completely cover the circumference of the pipe.

2. smoke-testing for leaks is required prior to use.

3. glovebag may only be used once and cannot be moved.

4. glovebag shall not be used on surfaces over **150°F.**

5. prior to disposal, removal of air from glovebag using HEPA-vac is required.

6. before beginning, loose and friable material adjacent to the work area shall be wrapped and sealed in two layers of 6 mil plastic.

7. when using an attached waste bag, such a bag shall be connected to a collection bag using hose or other material which can withstand the weight of all waste.

- 8. a sliding valve or other device shall separate waste bag from hose to ensure no exposure during disconnection.
 - 9. minimum of two persons shall perform Class I work. Other systems specified include: negative pressure glovebag; negative pressure glove box; water spray process; and mini-enclosure.
6. **Alternative control methods for Class I work** are allowed providing they are certified by a qualified individual.
7. **Work practices and engineering controls for Class II work**
- i All work shall be supervised by a competent person.
 - ii. For all indoor Class II jobs without a negative exposure assessment, or where conditions changed during the job in such a way that the PEL/EL may be exceeded, or where the material is not removed in a substantially intact state, the employer shall use one of the following methods:
 - A. **critical barriers shall be used.**
 - B. alternative barrier or isolation methods are allowed as verified by perimeter area monitoring or clearance monitoring.
 - C. impermeable drop cloths shall be placed beneath all removal activity.
 - iii. reserved
 - iv. applicable work practices and requirements shall be followed.
8. **Additional controls for Class II work**
- i. For removing **vinyl and asphalt flooring materials** containing ACM/PACM, the following practices apply...
 - A. flooring or its backing shall not be sanded.
 - B. vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.
 - C. resilient sheeting shall be removed by cutting with wet methods, rip-up methods are prohibited.
 - D. all scraping of residual adhesive and/or backing shall be done using wet methods.
 - E. dry sweeping is prohibited.
 - F. mechanical chipping is prohibited unless done in a negative pressure enclosure.
 - G. tiles shall be removed intact, unless employer demonstrates that intact removal is not possible.
 - H. when tiles are heated and can be removed intact, wetting may be omitted.
 - I. resilient flooring material including its mastic and backing shall be assumed to be an ACM unless proven otherwise by an industrial hygienist.
 - ii. For **removing roofing material** that are ACM, the following work practices apply...
 - A. roofing material shall be removed intact to the extent feasible.
 - B. wet methods shall be used to remove materials that are not intact, or will be rendered not intact, unless not feasible or will create safety hazards.
 - C. cutting machines shall be continuously misted during use, unless a

- competent person determines that misting substantially decreases worker safety.
- D. all loose dust left by sawing must be HEPA-vacuumed and bagged or placed in covered containers immediately.
 - E. ACM from a roof shall not be dropped or thrown to the ground:
 - 1. ACM not intact shall be lowered to the ground as soon as practicable, no later than the end of the work shift. While on roof it shall either be kept wet or covered in plastic.
 - 2. intact ACM shall be lowered to the ground as soon as practicable, no later than the end of the work shift.
 - F. after being lowered, unwrapped material shall be transferred to a closed receptacle
 - G. roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.
 - H. removal or repair of intact roofing less than 25 square feet in area (per day) does not require use of wet methods or HEPA vacuuming as long as material is not rendered non-intact. and no visible dust is created
- iii. For **removal of cementitious asbestos-containing siding, shingles, or panels** on building exteriors other than roofs, the following work practices apply...
- A. cutting, abrading, or breaking of siding, shingles, or **transite panels** shall be prohibited unless employer can demonstrate that other methods cannot be used.
 - B. each panel or shingle shall be sprayed with amended water prior to removal.
 - C. unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered, dust-tight chute, crane or hoist, or placed in an impermeable waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.
 - D. nails shall be cut with flat, sharp instruments.
- iv. For removal of **gaskets** containing ACM, the following work practices apply...
- A. if a gasket is visibly deteriorated and unlikely to be removed intact, removal shall be done with a glovebag.
 - B. reserved
 - C. the wet gasket shall be immediately placed in a disposal container.
 - D. scraping to remove residue must be performed using wet methods.
- v. For **removal of any other Class II material**, the following work practices apply...
- A. material shall be thoroughly wetted prior to and during removal.
 - B. material shall be removed intact unless the employer demonstrates that intact removal is impossible.
 - C. cutting, abrading, or breaking the material shall be prohibited unless the employer can demonstrate that other methods are not feasible.
 - D. material removed shall be immediately bagged, wrapped, or kept wetted until transferred to a closed receptacle no later than the end of

the work shift.

- vi. Use of **alternative work practices** and controls are allowed if the following provisions are complied with...
 - A. employer shall demonstrate with representative data that employee exposure will not exceed the PEL/EL under any anticipated circumstances.
 - B. a competent person shall evaluate and certify in writing that the method meets necessary standards of operation.
- 9. **Work practices and engineering controls for Class III work...**
 - i. wet methods shall be used.
 - ii. whenever feasible, local exhaust ventilation shall be used.
 - iii. use of impermeable drop cloths and either min-enclosures or glovebags is required whenever drilling, cutting, abrading, sanding, chipping, breaking, or sawing TSI or surfacing materials.
 - iv. containment of work area is required when there is no negative exposure assessment or monitoring results show the PEL has been exceeded.
 - v. respirators are required if TSI or surfacing material is being disturbed, or if there is no negative exposure assessment, or if the PEL has been exceeded.
- 10. **Class IV work shall be conducted by employees who have completed an asbestos awareness training program.** In addition, Class IV work must be done using wet methods, HEPA-vac, and prompt clean-up of debris...
 - i. employees shall wear respirators when working in areas that require them.
 - ii. TSI and surfacing material waste and debris shall be assumed to be asbestos containing.

(h) **Respiratory Protection**

- 1. The employer **shall provide respirators** and ensure that they are used under the following circumstances...
 - i. all Class I work
 - ii. Class II work where the ACM is not removed in a substantially intact state
 - iii. Class II and III work performed without using wet methods
 - iv. Class II and III work where the employer does not produce a negative exposure assessment
 - v. Class III work where TSI or surfacing ACM/PACM is disturbed
 - vi. Class IV work performed in regulated areas where other employees are required to wear respirators
 - vii. when employees are exposed above the PEL/EL
 - viii. in emergencies
- 2. **Respirator Selection**
 - i. When used, appropriately selected **respirators are to be provided at no cost to the employee.** The employer shall ensure that the employee uses the respirator provided.

- ii. **Respirators must be approved** by the National Institute for Occupational Health and Safety (NIOSH).
 - iii. **The employer shall provide a tight-fitting PAPR** in lieu of any negative-fitting respirator whenever:
 - A. an employee chooses to use this type of respirator;
 - B. the respirator will provide adequate protection; and
 - C. the employer shall inform any employee required to wear a respirator of this right
 - iv. **The employer shall provide a non-disposable, half-mask, air-purifying respirator** for Class II and III work where there is no negative pressure assessment has been produced, and for Class III work where TSI or surfacing ACM/PACM is disturbed.
 - v. **The employer shall provide a tight-fitting PAPR or supplied-air, pressure-demand respirator for Class I work without a NEA in which exposure assessment indicates exposure level will not exceed 1 f/cc. A supplied-air, pressure-demand respirator is required if the exposure assessment indicates exposure levels above 1 f/cc.**
- 3. Respiratory Program**
- i. The employer shall institute a respiratory program whenever respirators are used.
 - ii. Employees are permitted to change filters whenever an **increase in breathing resistance** is detected.
 - iii. Employees are **permitted to leave work areas** to wash their faces and respirator facepieces whenever necessary to prevent skin irritation.
 - iv. If an employee's most recent physical examination indicates that respirator use would be unsafe, then the employee shall be assigned to another job of equal pay if such a position is available.
- 4. Respirator Fit Testing**
- i. Employer ensures that the respirator issued to the employee fits properly.
- 5. Either quantitative (QNFT) or qualitative (QLFT) fit tests are required at the time of initial fitting and at least annually thereafter for each employee wearing a respirator. The qualitative fit tests may only be used for fitting half-mask respirators or full-face respirators where they are worn at levels at which half-face respirators are permitted.**

(i) Protective Clothing

- 1. Protective clothing is required for employees exposed to airborne asbestos in excess of the PEL/EL**, or where negative exposure assessment is not produced, and for Class I work involving the removal of over 25 linear or 10 square feet of TSI or surfacing ACM/PACM.
- 2. Laundering shall be done by an informed individual in a manner that prevents the release of fibers in excess of the PEL/EL.**
- 3. Contaminated clothing shall be transported in sealed, impermeable bags or containers and labeled appropriately.**

4. Inspection of Protective Clothing...

- i. a competent person shall examine worksuits at least once per workshift.
- ii. rips and tears shall be immediately mended or the worksuit shall be immediately replaced.

(j) Hygiene Facilities and Practices

1. Requirements for Class I work involving over 25 linear or 10 square feet of TSI or surfacing ACM/PACM...

- i. A decontamination area shall be established adjacent and connected to the regulated area. The employer shall ensure that employees enter and exit the regulated area through the decon.

A. Equipment (Dirty) Room

B. Shower area shall be located adjacent to the equipment room and the clean room. If the employer can demonstrate that it is not feasible to locate a shower there, then the employer must ensure that employees do not carry asbestos contamination outside the equipment room.

C. Clean change room shall be equipped with separate storage containers for each employee.

ii. Decontamination Entry Procedures...

A. enter through the clean room.

B. remove and deposit street clothing in lockers

C. put on protective clothing and respirator before leaving clean room.

D. before entering regulated area, employees must pass through the equipment room.

iii. Decontamination Exit Procedures...

A. before leaving the regulated area, remove all gross. contamination and debris from protective clothing.

B. remove protective clothing in the equipment room.

C. respirators shall not be removed in the equipment room.

D. employees shall shower prior to entering the clean room.

E. after showering, employees shall enter the clean room before changing into street clothes.

iv. Lunch Areas...

Whenever food or beverages are consumed at a Class I worksite, the employer shall provide a lunch area in which airborne concentrations of asbestos are below the PEL/EL.

2. Requirements for Class I work involving less than 25 linear or 10 square feet of TSI or surfacing ACM/PACM, and for Class II and Class III work where exposures exceed the PEL or EL or where there is no negative exposure assessment prior to operation.

i. **Equipment room** shall be established adjacent to the regulated area. It shall consist of an area covered by an impermeable drop cloth.

ii. The area must be large enough to accommodate cleaning of equipment and removing of personal protective equipment without spreading contamination.

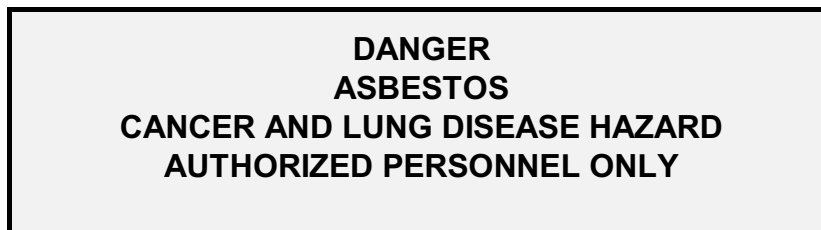
iii. **Work clothing must be cleaned with a HEPA-vacuum before it is removed.**

- iv. All equipment and surfaces of containers filled with ACM must be cleaned prior to removal from the area.
 - v. Employer shall ensure that employees enter and exit regulated area through the equipment (dirty) room.
3. Requirements for Class IV work are the same as those for Class I work involving less than 25 linear or 10 square feet of TSI or surfacing ACM/PACM unless the area in which the work is being done is part of a Class I operation involving greater than 25 linear or 10 square feet of TSI or surfacing ACM/PACM, in which case the more stringent requirements must be met.
4. **No smoking is allowed in the work area.**

(k) Communication of Hazards

1. For the purposes of this standard, employers and building owners are required to treat TSI and sprayed or troweled-on surfacing materials in buildings as ACM, with the exception noted in this section. Asphalt and vinyl flooring material installed no later than 1980 must also be considered to be ACM, unless proven otherwise. PACM is to be identified as ACM.
2. **Duties of Building/Facility Owners...**
- i. determine the presence, location, and quantity of ACM/PACM prior to work.
 - ii. written or direct verbal notification as to the presence, location, and quantity of ACM/PACM must be made to:
 - A. prospective employers applying or bidding for work whose employees reasonably can be expected to work in or adjacent to areas containing such material;
 - B. employees of the owner who will work in or adjacent to areas containing such material;
 - C. on multi-employer worksites, all employers of employees who will be working within or adjacent to areas containing such material; and
 - D. tenants who will occupy areas containing such material.
3. **Duties of employers** whose employees perform work in or adjacent to areas containing ACM/PACM and duties of building/facility owners whose employees perform such work as follows:
- i. employers shall identify the presence, location, and quantity of ACM/PACM prior to work;
 - ii. prior to work, employers shall inform the following persons of the location and quantity of ACM/PACM and the precautions to be taken –
 - A. owners of the building/facility
 - B. employees who will perform such work and employers of employees who work and/or will be working in adjacent areas – and
 - iii. employers shall, within 10 days of the completion of work, inform the building/facility owner and employers of employees who will be working in the area of the current location and quantity of ACM/PACM remaining in the area and final monitoring results, if any.

4. Employers who discover ACM/PACM on a worksite shall inform owners and other employees working at the site within 24 hours.
5. Criteria to rebut designation of PACM
 - i. At any time an employer or building owner may demonstrate that PACM does not contain asbestos. This information does not have to be communicated; however, the information, data, and analysis supporting the determination on non-PACM shall be retained.
 - ii. Means of demonstrating that PACM does not contain more than 1% asbestos are as follows:
 - A. having a complete inspection conducted that demonstrates that the material is not ACM.
 - B. testing of PACM includes analysis of bulk samples by an accredited inspector or CIH.
6. Signs shall be posted at the entrance to mechanical rooms/areas containing TSI, and surfacing ACM/PACM. Signs shall identify the material, its location, and appropriate work practices to avoid disturbing the material. The employer shall ensure that signs can be understood by employees.
7. **Signs...**
 - i. warning signs shall be posted at an appropriate distance from regulated areas.
 - ii. warning signs shall read –



when necessary, signs shall include –

**RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

- iii. employer shall ensure that employees comprehend the warning signs.
8. **Labels...**
 - i. labels shall be attached to all products containing asbestos and to all containers holding such products.
 - ii. labels shall be printed in large, bold letters on a contrasting background.
 - iii. labels shall read –

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

iv. reserved

vi. labels are not required where –

A. asbestos fibers have been modified by a bonding agent, coating, binder, or other material that will ensure that the PEL/EL will not be exceeded.

B. asbestos content is less than 1.0 % by weight.

vii. Labels shall be placed where they will clearly be noticed by employees. Appropriately placed may be posted instead of labels as long as they contain all the necessary labeling information. the employer shall ensure that labels can be understood by employee.

9. Employee Information and Training

i. The employer shall institute, **at no cost to the employee, a training program for all employees** who are likely to be exposed in excess of a PEL and for all employees who install asbestos materials or perform **Class I** through asbestos operations. The employer shall ensure employees' participation.

ii. Training shall be provided prior to or at the time of initial assignment and annually thereafter.

iii. Training for Class I operations and for Class II operations that require the use of critical barriers and/or negative pressure enclosures shall be equivalent to the EPA Model Accreditation Plan (MAP) asbestos abatement worker training.

iv. Training for other Class II work...

A. Training for work involving ACM such as **roofing, flooring, siding, or transite panels** should include all of the elements listed in section (k)(9)(viii) and in addition, the work practices and engineering controls set forth in part (g) specific to that generic category. **This training shall include a "hands-on" section and shall take at least 8 hours.**

B. Employees working with more than one category of material shall receive training applicable to each category of material.

C. Employees working with materials not listed in section (k)(9)(iv)(A) shall be trained on the applicable work methods.

v. **Training for Class III employees** shall be consistent with EPA requirements for training local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2). **This training shall include a "hands-on" section and take at least 16 hours.** At the discretion of the competent person, greater training requirements may apply.

vi. **Training for employees performing Class IV operations** shall be consistent with EPA requirements for training local education agency maintenance

and custodial staff as set forth at 40 CFR 763.92(a)(1). This course shall include information as to the location of TSI and ACM/PACM, and instruction in recognition of damage, deterioration, and delamination of ACM. **This course shall take at least 2 hours.**

- vii. Training for employees who are likely to be exposed in excess of the PEL and are not otherwise required to be trained under paragraph (k)(9)(iii) through (vi) of this section, shall meet the requirements of paragraph (k)(9)(iii).
- viii. Training programs shall be conducted in a manner that the employee is able to understand. In addition to EPA MAP curriculum, the course shall include the following information.
 - A. methods of recognizing asbestos.
 - B. health effects associated with asbestos exposure.
 - C. relationship between smoking and asbestos in producing lung cancer.
 - D. nature of operations that could result in exposure to asbestos, and the importance of necessary protective controls to minimize exposure.
 - E. purpose, proper use, fitting instructions, and limitations of respirators.
 - F. appropriate work practices.
 - G. medical surveillance program requirements.
 - H. content of this standard, including appendices.
 - I. names, addresses, and phone numbers of public health organizations which provide information concerning smoking cessation.
 - J. requirements for posting signs and affixing labels.

10. Access to Training Materials...

- i. free, written materials relating to the employee training program.
- ii. employer shall provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.
- iii. self-help smoking cessation programs shall be made readily available.

(l) Housekeeping

1. Vacuuming

Vacuums must be HEPA filtered.

2. Waste Disposal

All asbestos wasted and contaminated materials shall be disposed of in sealed, labeled, impermeable containers except in roofing operations where the procedures specified in (g)(8)(ii) of this section apply.

3. Care of Asbestos-containing Flooring Material...

- i. all vinyl and asphalt flooring shall be maintained in accordance with this paragraph unless the owner demonstrates that the material is not asbestos containing.
- ii. **sanding is prohibited.**

- iii. stripping of finishes shall be done using low abrasion pads at speeds lower than 300 rpm and wet methods.
 - iv. burnishing or dry buffing may be performed only on flooring which has sufficient so that the pad cannot contact the flooring material.
4. **Waste and debris and accompanying dust** in an area with TSI or surfacing material or visibly deteriorated ACM:
- i. shall not be dusted or swept dry, or vacuumed without using a HEPA filter; and
 - ii. shall be promptly cleaned up and disposed of in leak-tight containers.

(m) Medical Surveillance

1. General

i. Employees covered...

A. Employers shall institute programs that cover all employees who spend 30 or more days per year doing Class I, II, or III work; or are exposed at or above the permissible exposure limit for a combined 30 days or more per year. Any day in which a worker engages in Class II or Class III work for one hour or less, in accordance with work practices, shall not be counted.

B. For employees required to a negative pressure respirator, employers must, under the supervision of a physician, shall ensure employees are physically able to perform the work and use the equipment.

ii. Examination...

A. must be performed by a licensed physician at no cost to the employee.

B. anyone other than a licensed physician who administers the pulmonary function test shall complete a training course in spirometry.

2. Medical Examinations...

i. Examinations are to be conducted:

A. prior to beginning of work with a negative pressure respirator.

B. within 10 working days following the 30th day of exposure at or above the permissible exposure in one year, or when engaging in Class I, II, or III work for a combined total of 30 or more days per year.

C. annually after initial exam

D. if the examining physician determines that more frequent examinations are needed, employer shall provide such examinations.

E. no examination is required if employee records show that last examination was within the past 1-year period.

ii. Medical examinations shall include:

A. medical and work history **with special emphasis on pulmonary, cardiovascular, and gastrointestinal systems.**

B. on initial exam, the standardized questionnaire contained in Part 1 of

- Appendix D; **on the annual examination**, the abbreviated standardized questionnaire contained in Part 2 of Appendix D.
- C. physical examination directed at the pulmonary and gastrointestinal systems, and a pulmonary test.
 - D. any other examinations or tests deemed necessary by the physician.
3. The employer shall provide the following information to the examining physician...
- i. copy of this standard and Appendices D, E, G, and I.
 - ii. description of the employee's duties as they relate to his/her exposure.
 - iii. employee's representative exposure level or anticipated exposure level.
 - iv. description of any personal protective and respiratory equipment used.
 - v. information from employee's previous medical exams.
4. **Physician's Written Opinion...**
- i. Physician shall provide the employer with a written opinion containing the following information:
 - A. any medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos.
 - B. any recommended limitations on the employee or on the use of personal protective equipment.
 - C. statement that the employee has been informed by the physician of the results of the examination and of any medical conditions that may result from asbestos exposure.
 - D. statement that the employee has been informed by the physician of the increased risk of lung cancer due to the combined effect of smoking and asbestos exposure.
 - ii. **The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to the occupational exposure to asbestos.**
 - iii. **The employer shall provide a copy of the physician's written opinion to the employee within 30 days of receipt.**

(n) Recordkeeping

1. Objective data for negative exposure assessment...
- i. When the employer has relied on objective data to demonstrate that a material and operation are not capable of releasing fibers of asbestos in concentration greater than the PEL/EL, then such records shall be maintained for the duration of the employer's reliance upon such objective data.
 - ii. records shall include the following information:
 - A. product qualifying for exemption;
 - B. source of the objective data;
 - C. testing protocol, test results;
 - D. description of the operation exempted; and

- E. other relevant data.
 - iii. records shall be maintained for the duration of the employer's reliance upon such objective data.
2. **Exposure Assessments**
Employer shall keep an accurate record of all measurements taken to monitor employee exposure. **These records shall be maintained for the duration of employment plus 30 years.**
 3. **Medical Surveillance**
Employer shall maintain an accurate record of each employee's medical surveillance for the duration of employment plus 30 years.
 4. **Training records** shall be maintained for **1 year** beyond the last date of employment.
 5. When the employer has relied on data to demonstrate that PACM is not asbestos-containing material, such data shall be maintained for as long as they are relied upon.
 6. When the building owner has communicated and received information concerning identification, location, and quantity of ACM/PACM, written records of such notifications shall be maintained by the building owner for the duration of ownership and shall be transferred to successive owners.
 7. **Availability of Records...**
 - i. upon written request, the employer shall make all records available to OSHA.
 - ii. **exposure records shall be made available to affected employees, former employees, and OSHA.**
 - iii. **medical records shall be made available to the affected employees and anyone with written consent from the employee, and OSHA.**
 8. When employer ceases to do business and there is no successor to receive and retain the records for the prescribed period, the employer shall notify OSHA at least 90 days prior to disposal and, upon request, transmit them to NIOSH.

(o) Competent Person

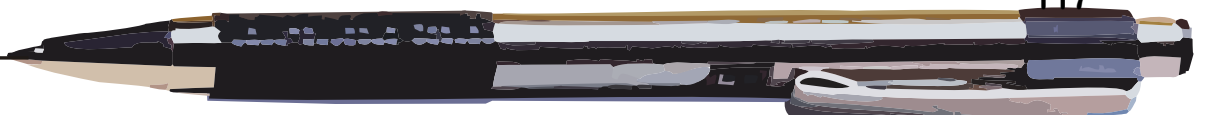
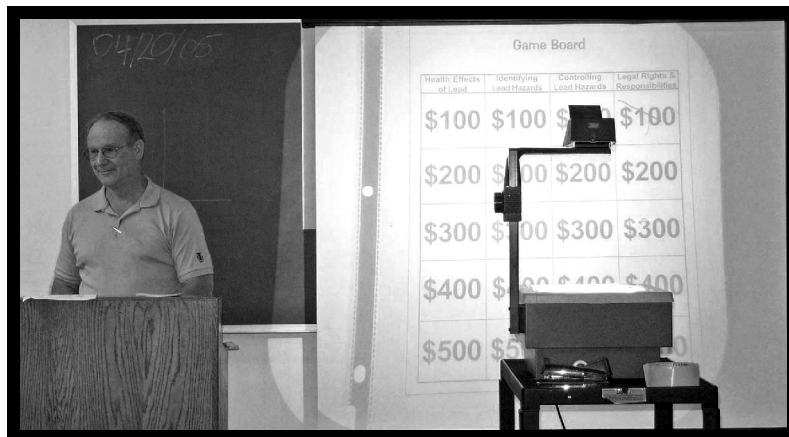
1. On all construction sites covered by this standard, the employer shall designate a competent person.
2. **Competent person is required to conduct frequent and regular inspections of job sites, material, and equipment.**
3. **Class I jobs require on-site inspections at least once during each work shift, and at any time at employee request.** Class II, II, and IV jobs require on-site inspections at sufficient intervals to assess whether conditions have changed, and at any reasonable time at employee request.
 - i. **Class I and II worksites** require a competent person to supervise the following duties...
 - A. set up the regulated area, enclosure, or other containment.

- B. ensure the integrity of the enclosure or containment.
 - C. set up procedures to control entry and exit from the enclosure and/or area.
 - D. supervise all employee exposure monitoring.
 - E. ensure that employees wear respirators and protective clothing as required.
 - F. ensure that employees set up and remove engineering controls, use work practices and personal protective equipment in compliance with all requirements.
 - G. ensure that employees use the hygiene facilities and observe the decontamination procedures.
 - H. ensure that engineering controls are functioning properly.
 - I. ensure that notification requirements are met.
- 4. Training for the Competent Person...**
- i. For Class I and II work, training shall meet the criteria of EPA's MAP (40 CFR 763, Subpart E, Appendix C).
 - ii. For Class III and IV work, training shall be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth in 40 CFR 763.92(a)(2).



Notes and Scribbles

Activities



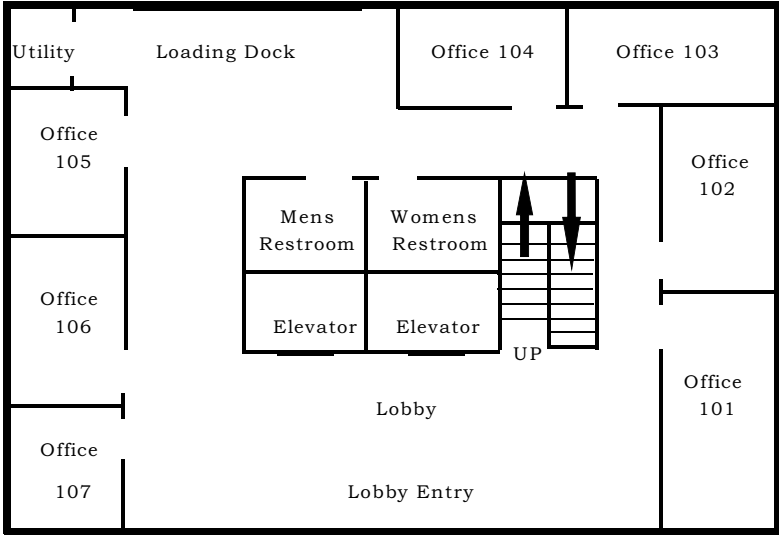
PLANNING ACTIVITY

Work in small groups to decide on the answers to the questions below. There may be more than one way to answer the questions. It is important that you figure out why you want to handle a situation in a certain way.

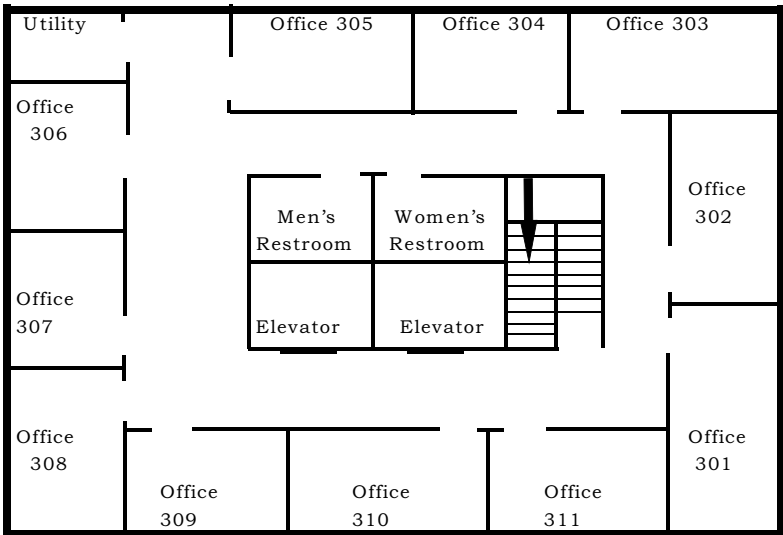
OVERVIEW

The administration building will be partially occupied while the asbestos removal is going on. All heavy equipment must be carried up one of the two elevators. A diagram of the first and third floors is shown below.

Administration Building Floorplan



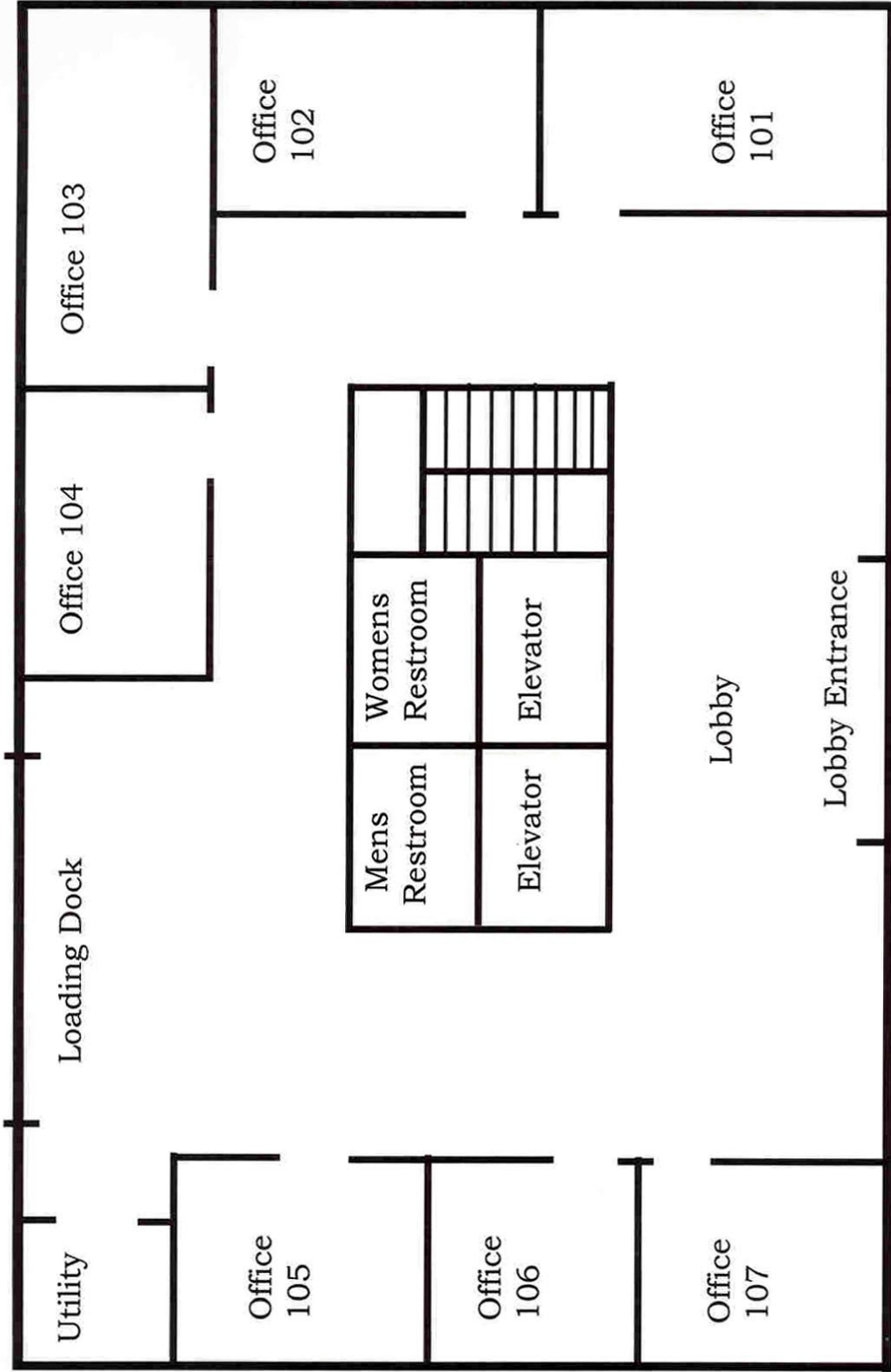
First Floor



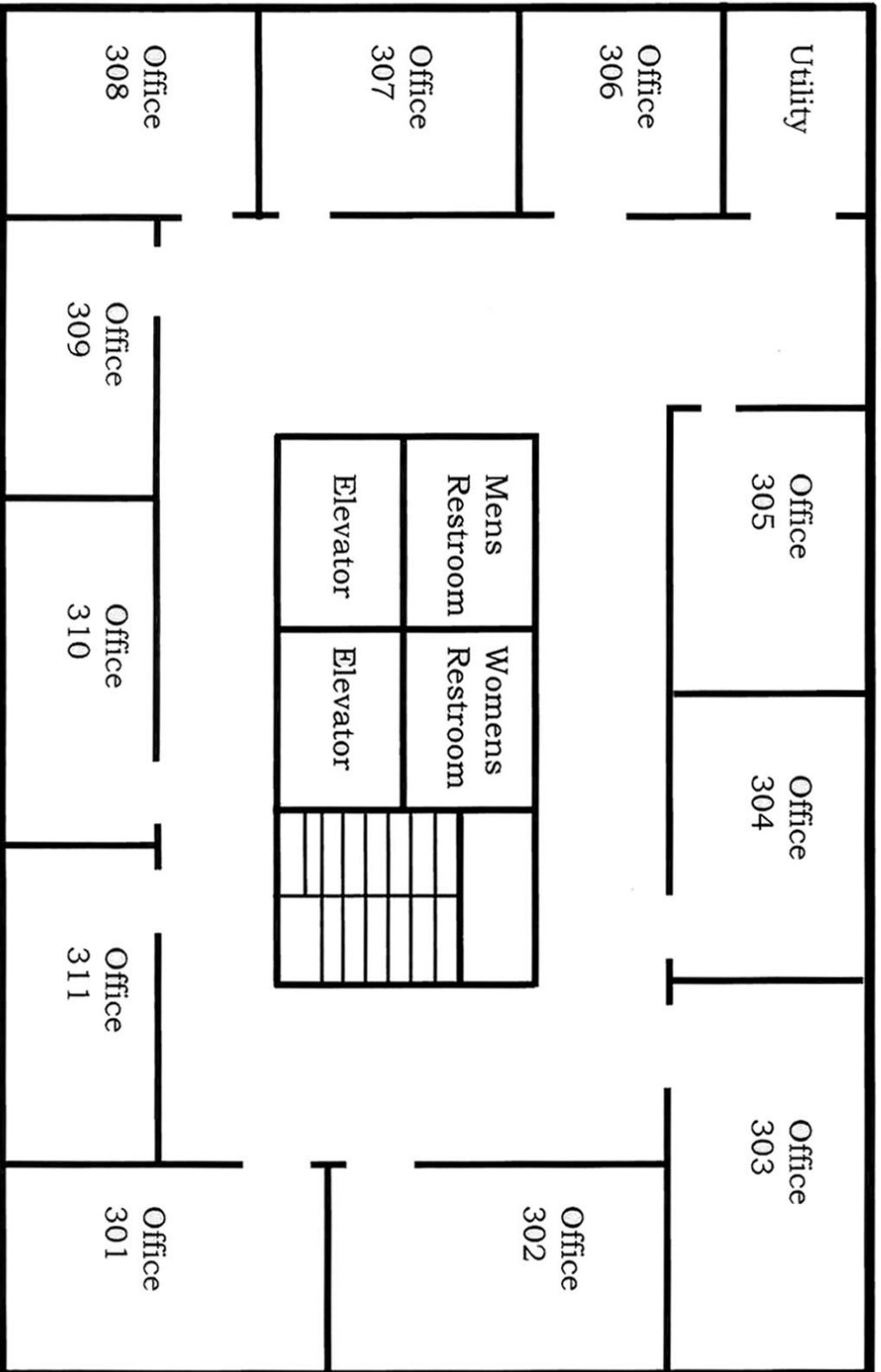
Third Floor

2. Draw a diagram showing how you will set up your containment, where you will place the decon, where you will place the waste load-out, where you will place the negative air machines, and where you will exhaust the negative air machines. You can use the diagrams on the next two pages for your drawings if you aren't an artist use this space for scribbling and thinking out loud.

Administration Building Floorplan - First Floor



Administration Building Floorplan - Third Floor



4. How will you handle asbestos waste from this project to avoid frightening the building occupants or exposing them to asbestos?



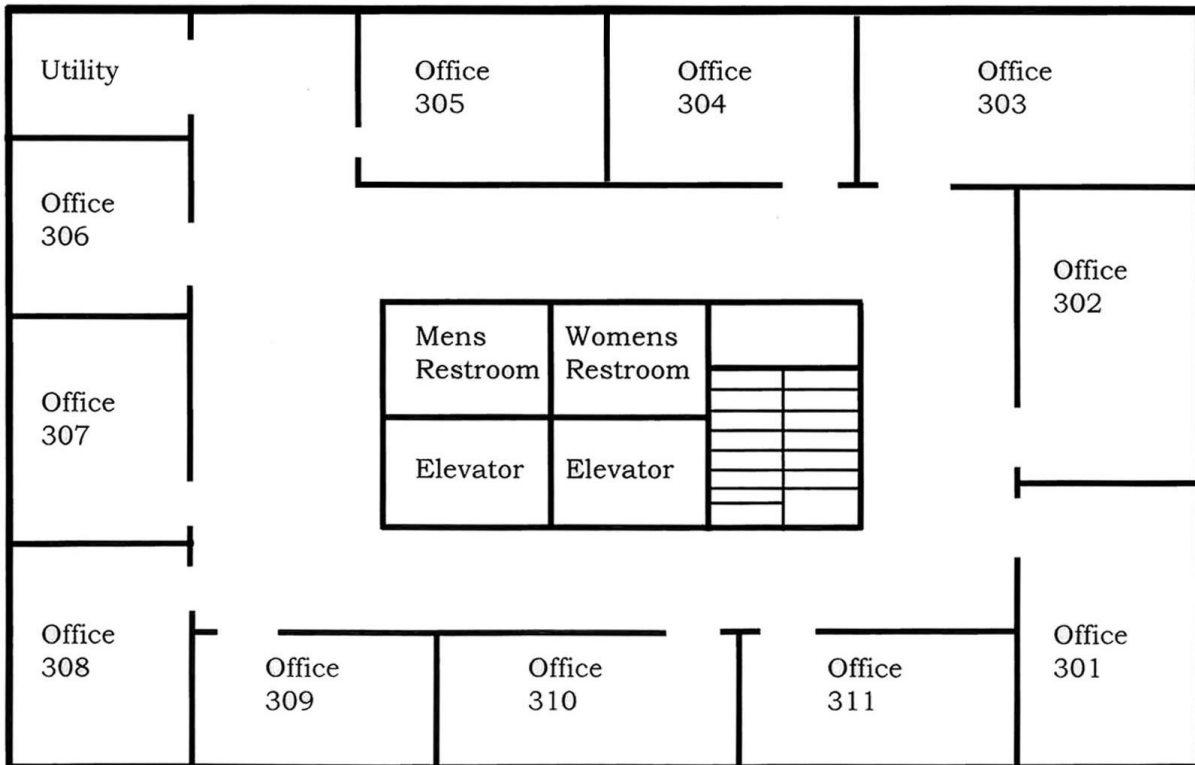
6. In office 303 of the administration building, some electrical work had been done. Ceiling tiles were taken out and left on the floor. They had been crushed underfoot into the carpet.

A. Are there any special procedures you would use in the area before removing the overhead tiles and sprayed-on asbestos? Is any personal protection necessary?

B. The overhead spray-on fire-proofing is being removed. After most of the asbestos is off, small patches of white can still be seen in many areas. What can you do to make sure this passes final inspection?

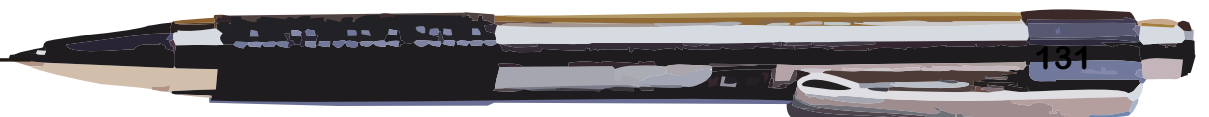
C. In office 303 the space above the suspended ceiling serves as a return air plenum for the ventilation system. There are openings in the ceiling between room 303 and the room next to it. Are there any special precautions that should be taken in removing the sprayed-on asbestos above the ceiling?

Administration Building Floorplan - Third Floor



Asbestos Decontamination Card Sort Activity

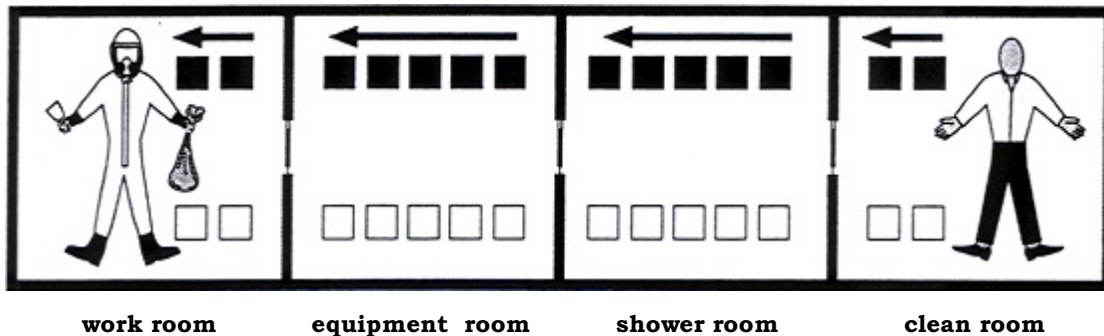
Prepared by
BRASH
University of Kentucky, Lexington, Kentucky
October 1994



Asbestos Decontamination Car Sorting Activity

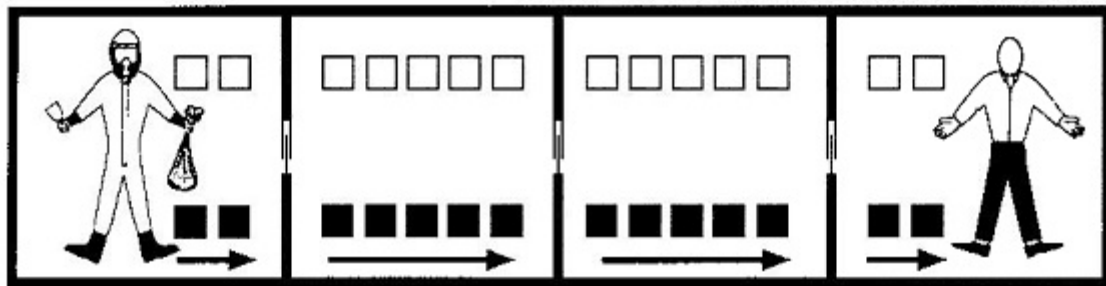
Instructions

1. To do this exercise you should have decontamination cards, a decontamination board, and a decontamination card key.
2. Look at the first set of cards that your instructor gives you and visualize the steps that an asbestos worker would need to go through to move from the clean room to the work room.
3. Note that on the decontamination board, the rooms have boxes in which to place the decontamination cards. The row of boxes on top of the rooms should be used for the first set of cards that your instructor gives you.



4. Separate the cards into piles that correspond to the room in which they should be performed for a worker to enter an asbestos contaminated area. There may be more spaces on the board than there are cards.
5. Within each room, place the cards in the order of what step you should do from entering to leaving the room. Make sure that you are moving in the same direction as the arrows between the boxes on the decontamination board.
6. After you have completed placing the set of cards representing what a worker must do in order to enter a contaminated area, your instructor will give you a second set of cards for a worker to exit an asbestos contaminated area.

7. Look at the second set of cards that your instructor gives you and visualize the steps that an asbestos worker would need to go through to move from the work room to the clean room.
8. Note that on the decontamination board, the work, contaminated, shower, and clean rooms have boxes to place the decontamination cards. The row of boxes on the bottom of the rooms should be used for the second set of cards that your instructor gives you.



work room

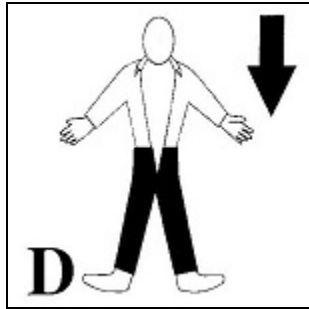
contaminated room

shower room

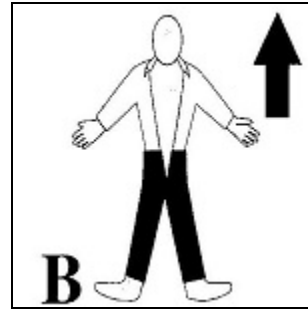
clean room

9. Separate the cards into piles that correspond to the room in which should be performed for a worker to exit an asbestos contaminated area. There may be more spaces on the board than there are cards.
10. Within each room, place the cards in the order of what step you should do from entering to leaving the room. Make sure that you are moving in the same direction as the arrows between the boxes on the decontamination board.
11. After you have completed placing the set of cards for a worker to exit a contaminated area, your instructor will collect your decontamination board.

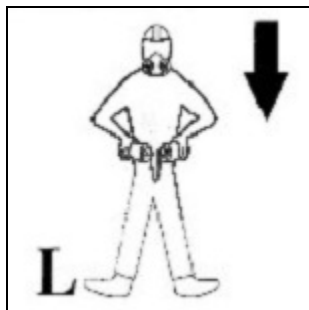
Asbestos Decontamination Card Key



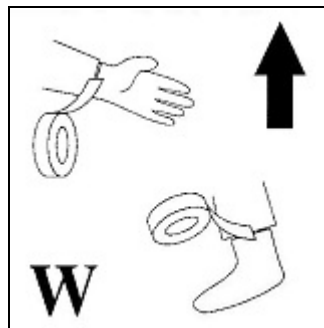
remove street clothes



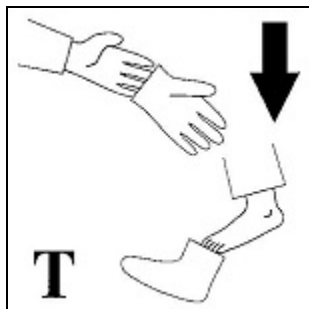
put on street clothes



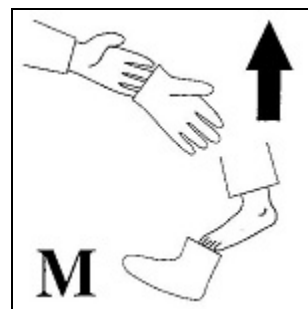
remove coveralls



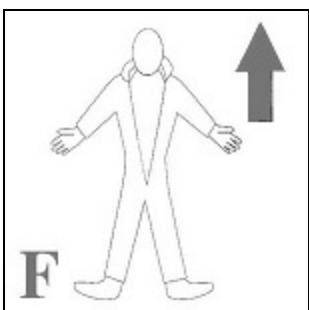
put tape on gloves and boots



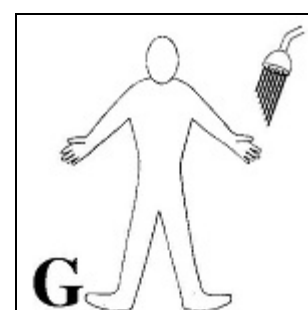
remove gloves and boots



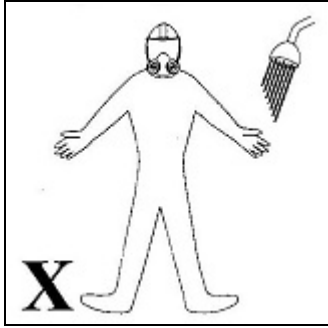
put on gloves and boots



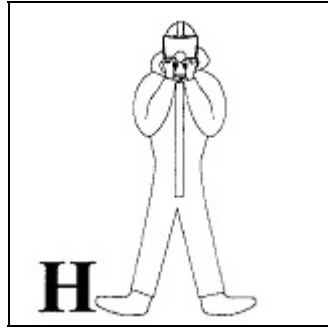
put on coveralls



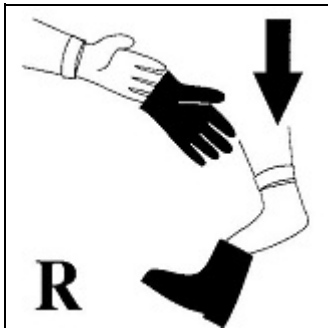
shower without respirator



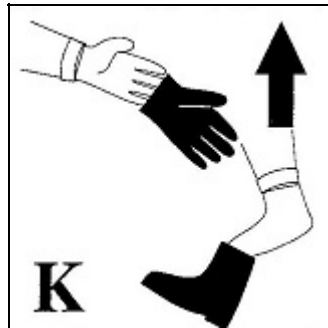
shower with respirator



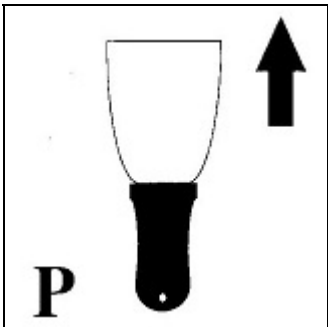
check respirator



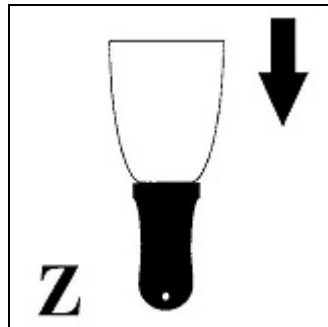
remove work gloves and work boots



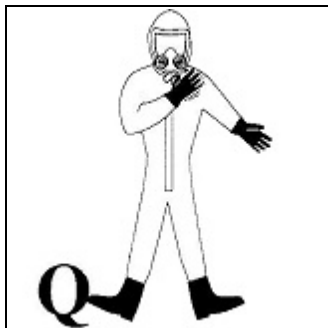
put on work gloves and work boots



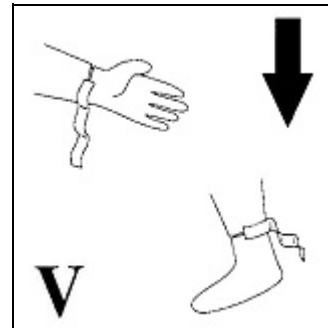
pick up tools



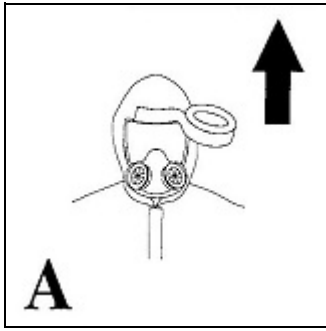
drop tools



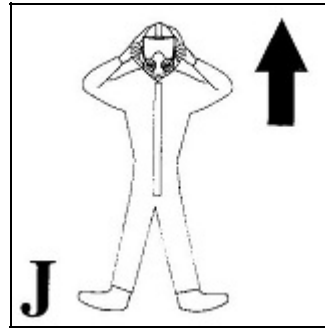
wipe off gross contamination



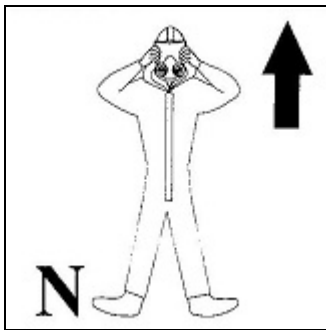
remove tape



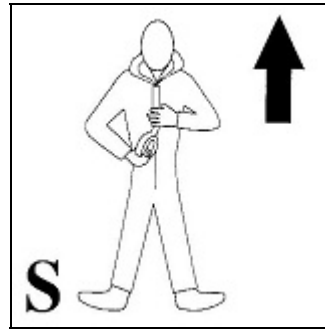
tape hood



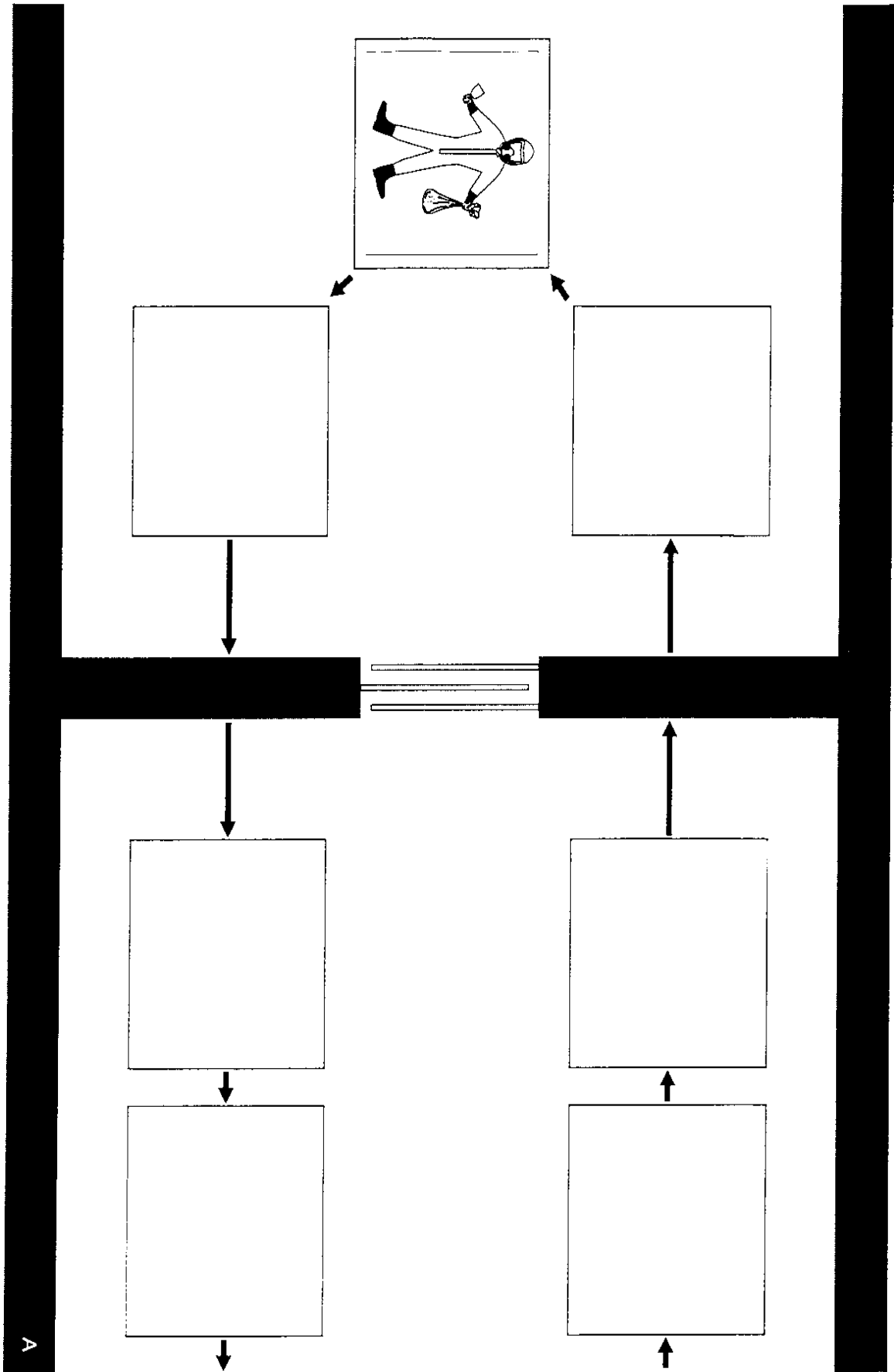
put up hood

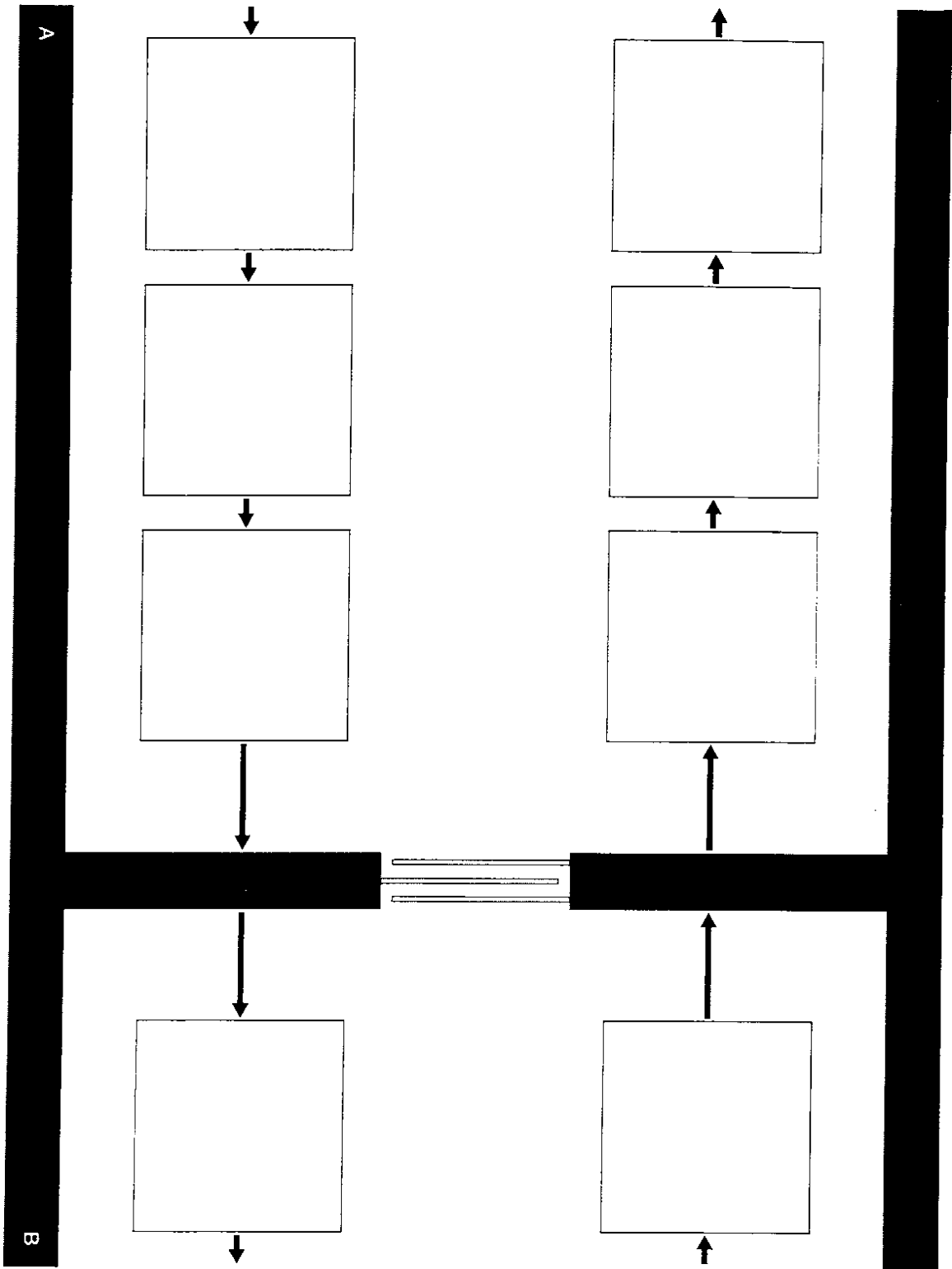


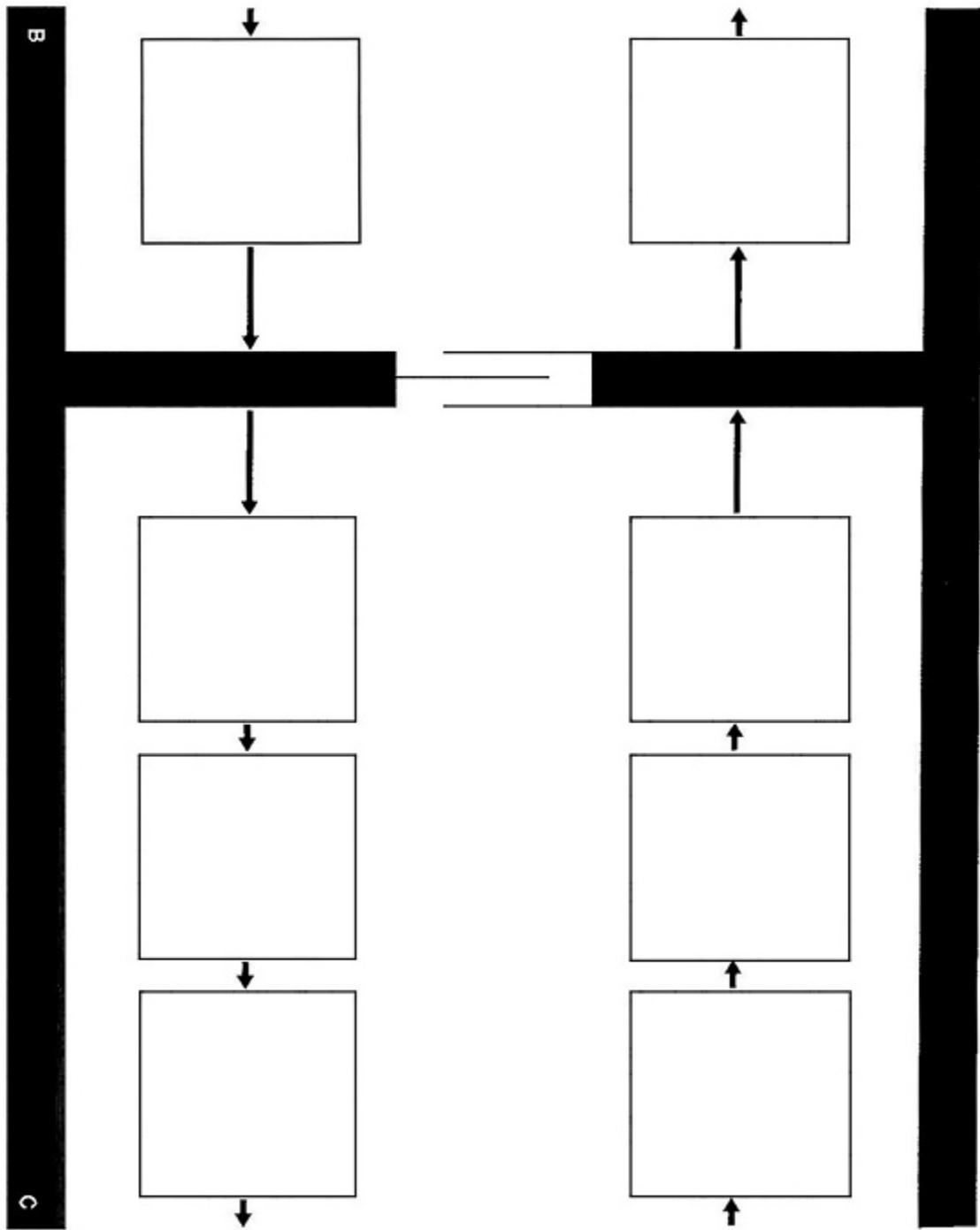
don
respirator



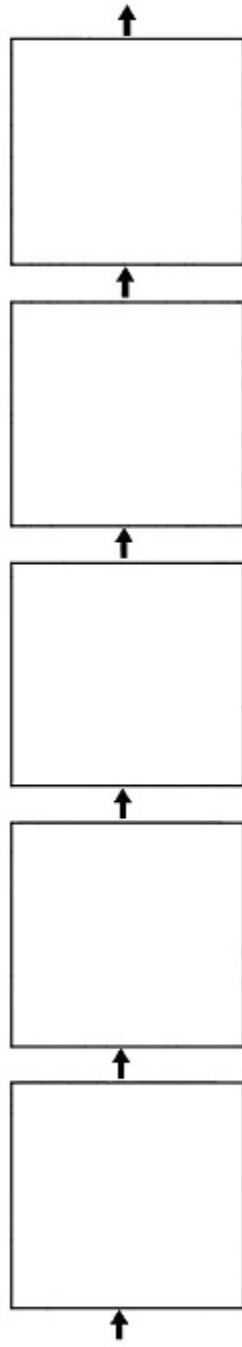
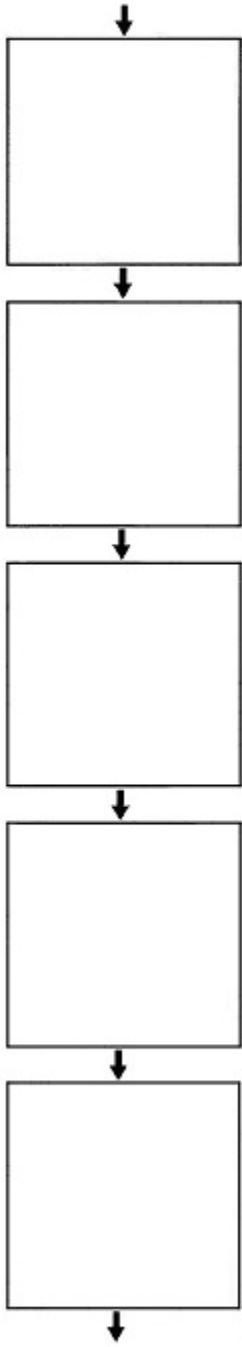
tape suit

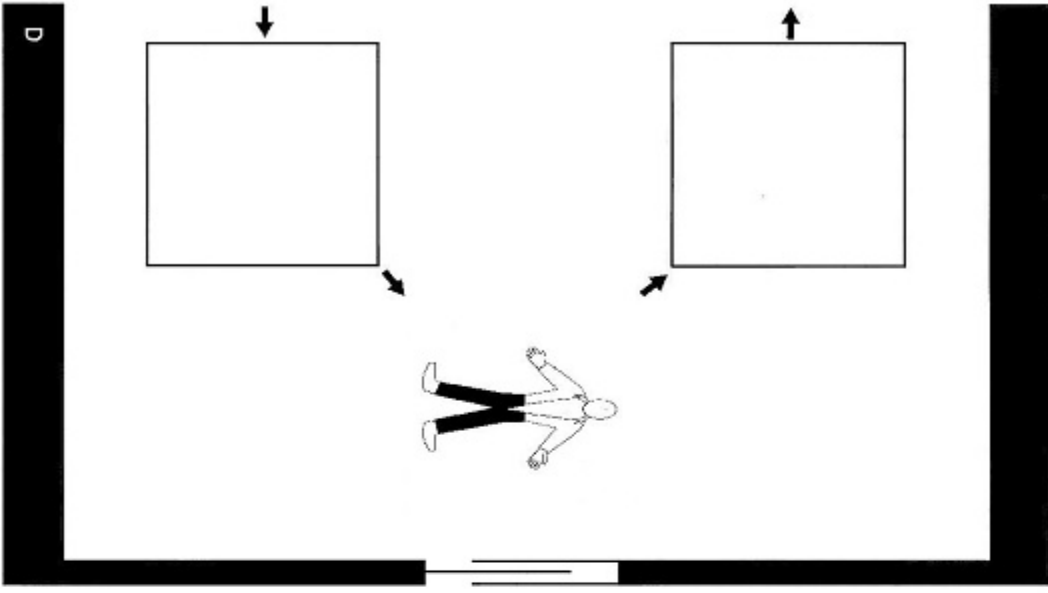


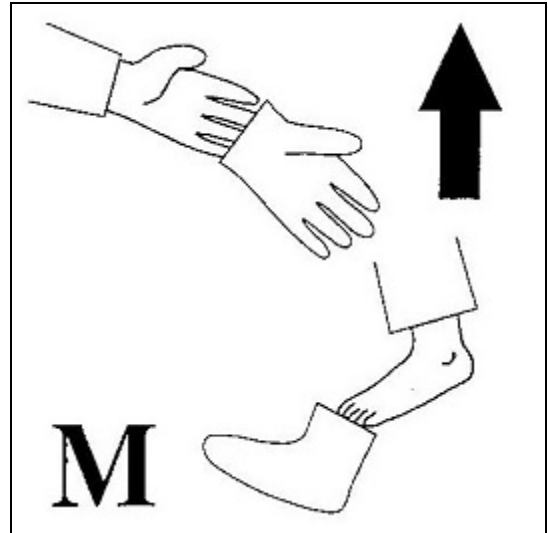
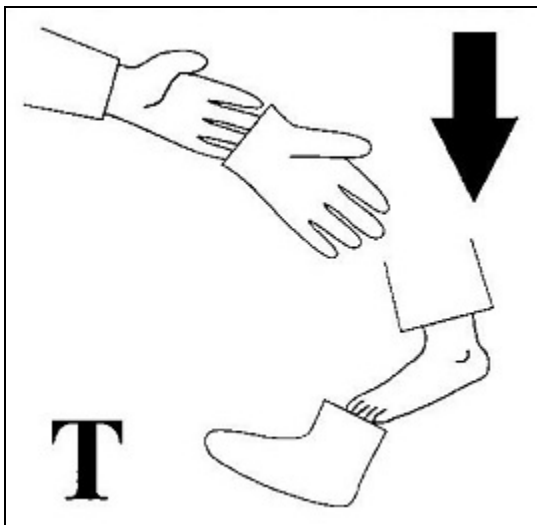
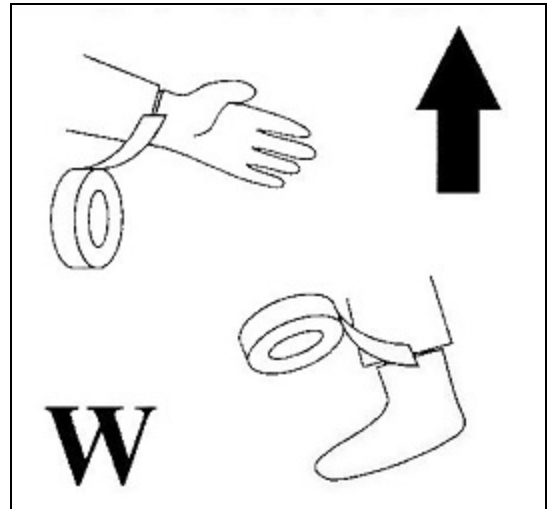
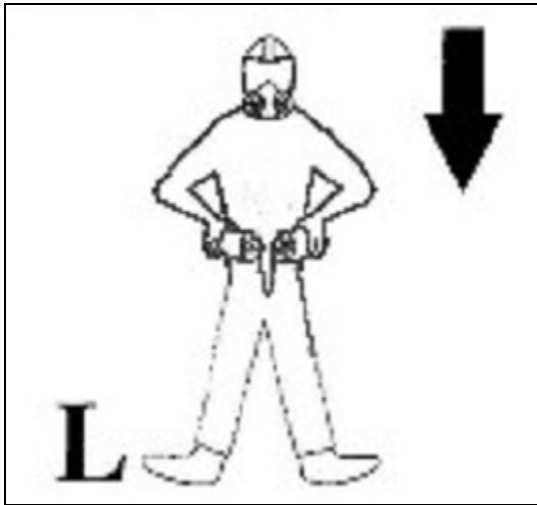
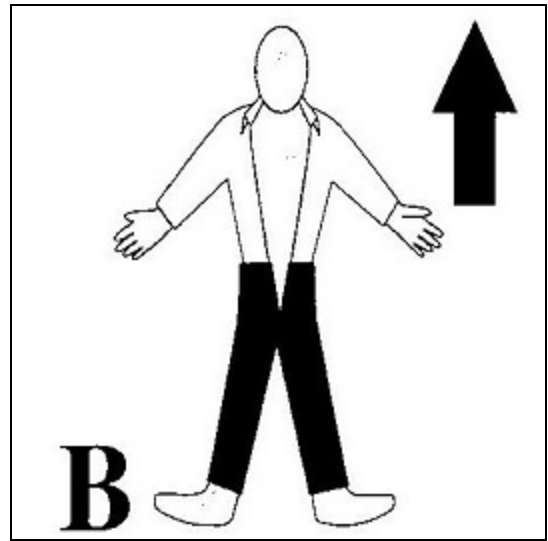
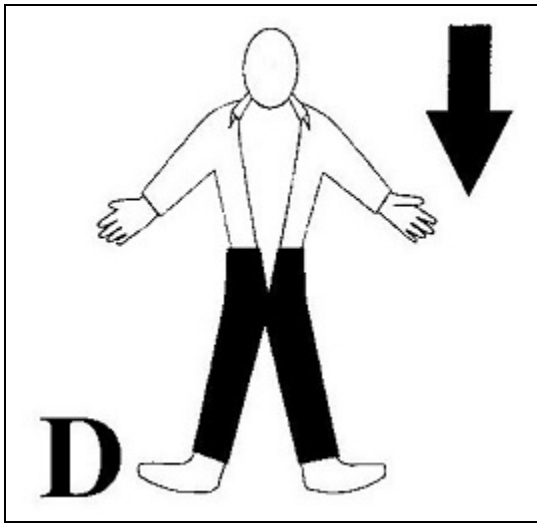


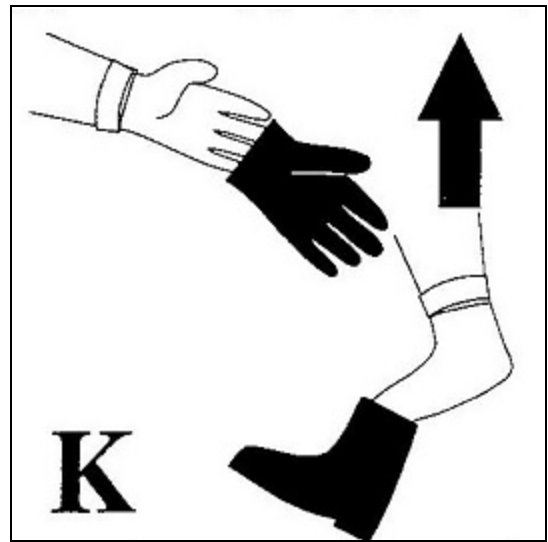
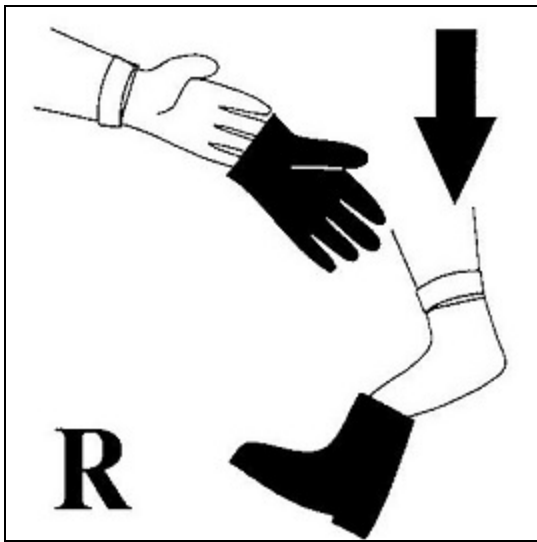
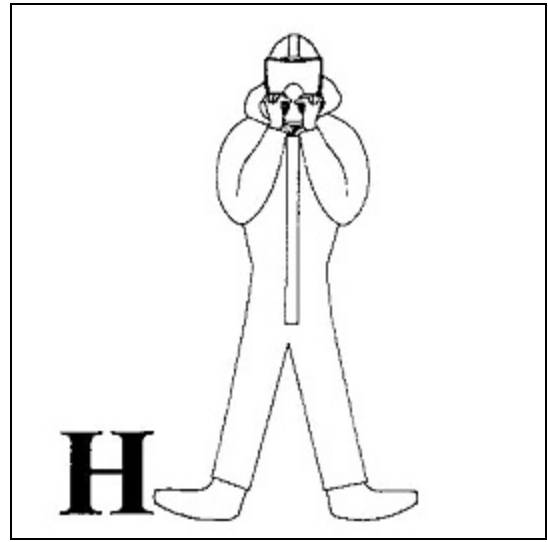
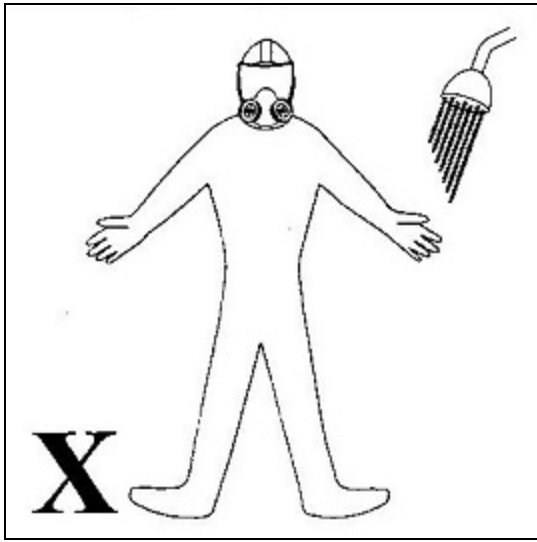
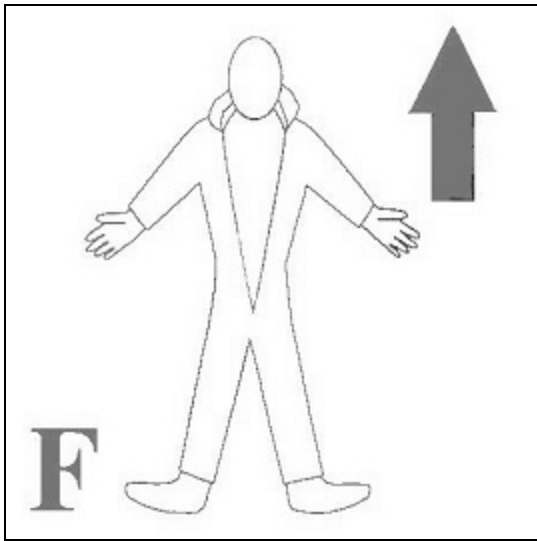


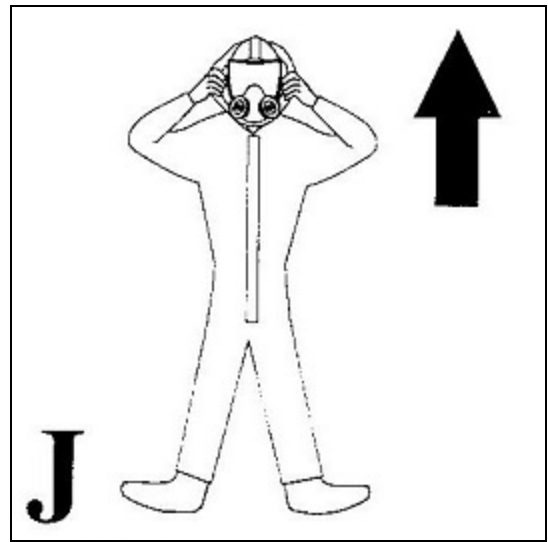
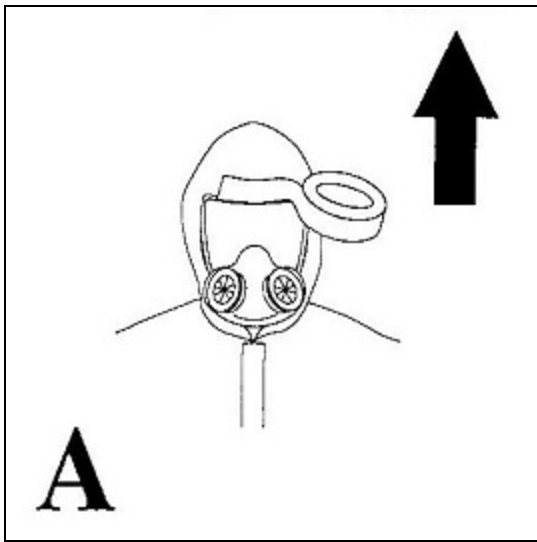
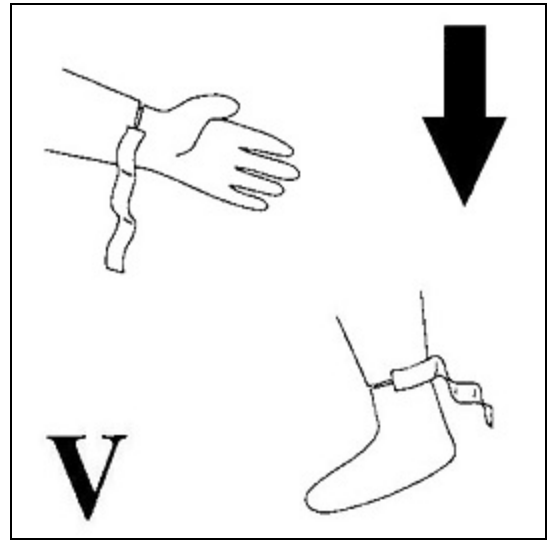
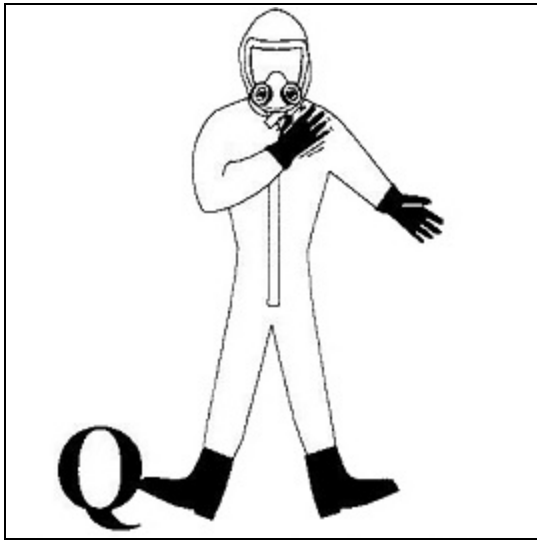
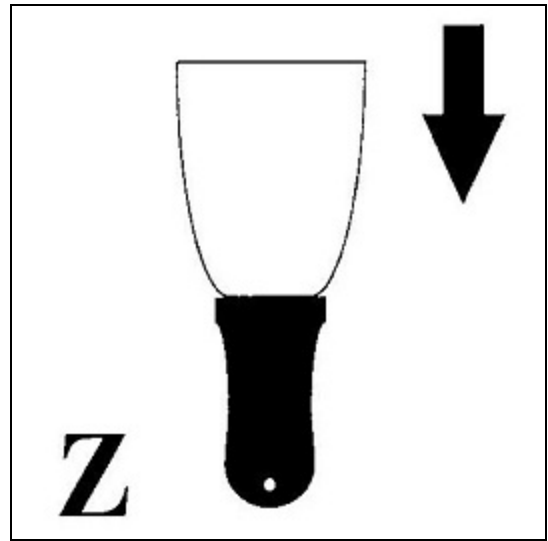
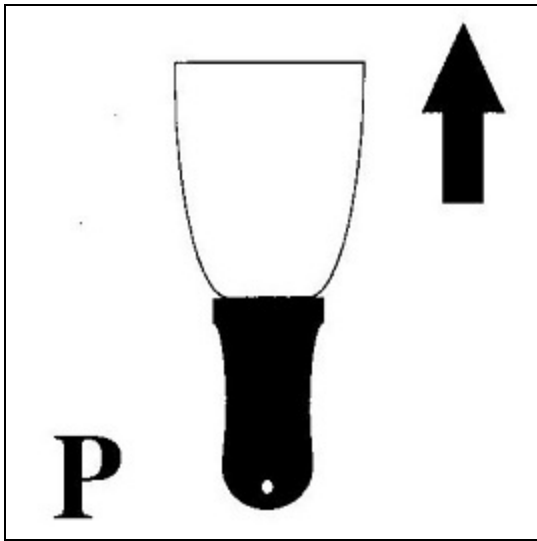
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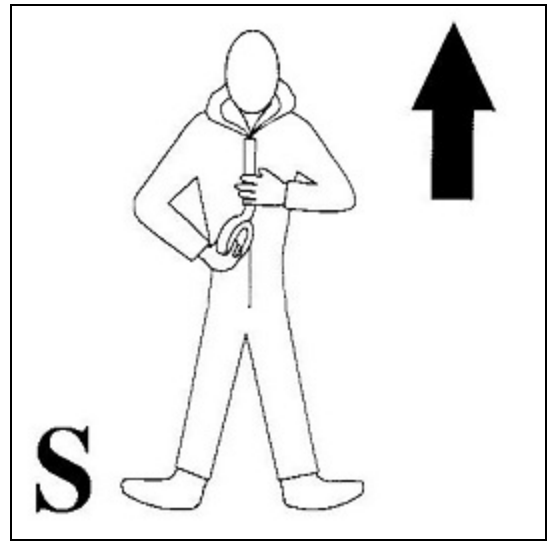
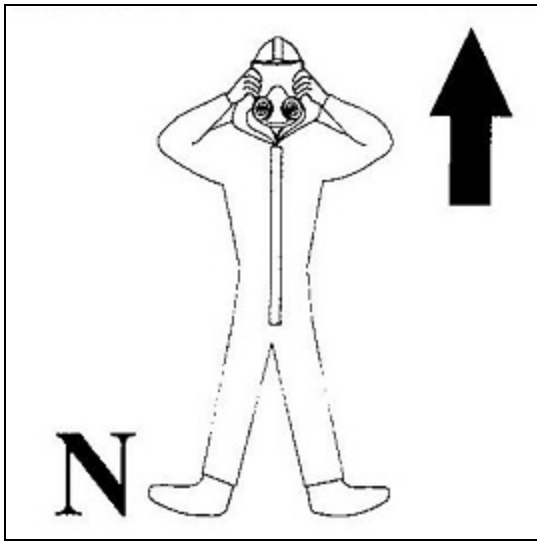












Name _____

ID# _____

Respirator Hands-on Activity

- | <input type="checkbox"/> Inspection: OK? | Yes | No | If "No", what is wrong? |
|--|--------------------------|------------------------------|-----------------------------|
| Respirator 1 | <input type="checkbox"/> | <input type="checkbox"/> ___ | A. Dirty |
| Respirator 2 | <input type="checkbox"/> | <input type="checkbox"/> ___ | B. Missing Inhalation valve |
| Respirator 3 | <input type="checkbox"/> | <input type="checkbox"/> ___ | C. Missing Exhalation valve |
| Respirator 4 | <input type="checkbox"/> | <input type="checkbox"/> ___ | D. Torn strap/harness |
| | | | E. Torn Inhalation valve |
| | | | F. Improper filter pair |

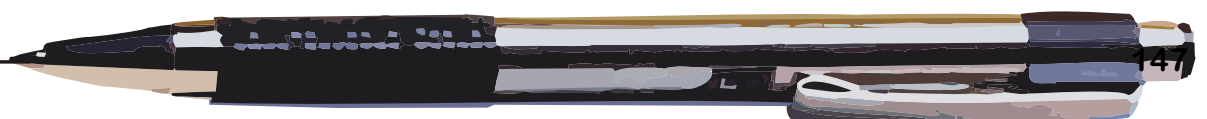
No more than one item per respirator. No item can be used more than once.

Donning & Doffing: Steps completed:

- Bend head slightly forward, place respirator under chin, and fasten strap at back of neck – position facepiece over mouth and nose – pull harness over head with the harness properly covering the crown of the head and no twisted straps.
- Perform negative seal check twice.
- Perform positive seal check twice.
- Remove or doff respirator by bending head over slightly, disconnecting the neck strap first, and then pulling harness over the top of the head – with the respirator resting in one hand.

Washing and Storing a Respirator: Steps completed:

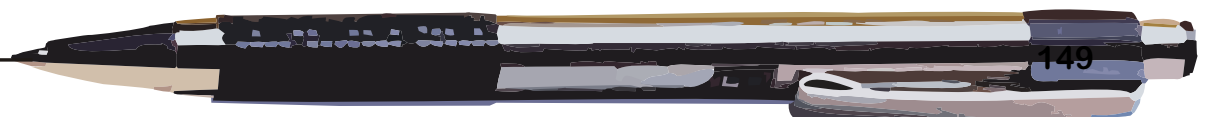
- Wash respirator and its parts thoroughly in a proper wash/rinse sequence.
- Store complete respirator in a bag.



Last Year in Review Activity

Please ✓ each category that relates to problems encountered or seen over the last 12 (twelve) months.

General Information	Yes	NO	N/A
On an asbestos job do you:			
Construct decons?			
Build scaffolds?			
Build enclosures?			
Build mini-enclosures?			
Build waste load-out rooms?			
Remove asbestos			
Class I?			
Class II?			
Class III?			
Work near asbestos (Class IV)?			
Apply an encapsulant or replacement material?			
Clean up the work area?			
Were you supplied an respirator by the contractor?			
½ face APR			
Full-face APR			
Full-face tight-fitting PAPR			
Air-line Supplied Air			



General Information	Yes	NO	N/A
Rights and Responsibilities			
Did you receive an annual medical evaluation Paid for by the employer?			
Did you request results of air monitoring?			
You see any written results of air monitoring?			
Did you calculate a MUC?			
Did you need a MSDS and ask to see one?			
Did you do a job or task w/o proper training?			
Did you report a safety/health issue to your supervisor or union representative?			
Did you work with someone who was inexper- ienced or poorly trained – who scared you?			
Were you fit tested?			
Properly			
For each brand, model, and size respirator you wore?			
Hazard Recognition			
Did you work with or near a hazardous material without reading a label, placard, or MSDS?			
Did you work in an area where you feel you had a noise exposure?			
Did you feel dizzy, nauseous, or have other symptoms while on site?			
Did you smell a chemical while wearing your Respirator?			

General Information	Yes	NO	N/A
Personal Protective Equipment			
Did not wear a respirator when working with asbestos?			
Did you work without proper PPE or with faulty PPE?			
Did you fail to seal check your respirator before putting it on?			
Did you feel the effect of heat or cold stress when working with PPE during adverse conditions?			
Work Practices			
Did you drink alcoholic beverages the night before working in PPE w/a hangover?			
Did you enter a confined space w/o following safe entry procedures?			
Did you report an unsafe work practice?			
Did you work with electrical equipment not GFCI protected?			
Did you remove asbestos while it was dry?			
Did you remove asbestos in an area w/o containment?			
Did you have plastic sheeting rip, tear, or just fall down during removal?			
Did you work with someone who was careless with safety and health guidelines?			
Did you eat, drink or smoke in a containment?			

General Information	Yes	NO	N/A
Decontamination & Environmental Control			
Did you work on an abatement w/o showers?			
Did you go through a decon w/o completely showering			
Did you perform improper/inadequate decontamination procedures?			
Did you wear asbestos-contaminated work shoes home?			
Did you work on a job where onlookers have caused a problem?			
<p>List any other serious safety and health problems that occurred on asbestos jobs.</p>			
<p>What could have been done to prevent these safety and health problems?</p>			



Negative Air Machine Calculation Activity

$\text{Volume} = \text{length} \times \text{width} \times \text{height}$



$\text{Volume} \div 15 = \text{amount of air that needs to be moved per minute}$



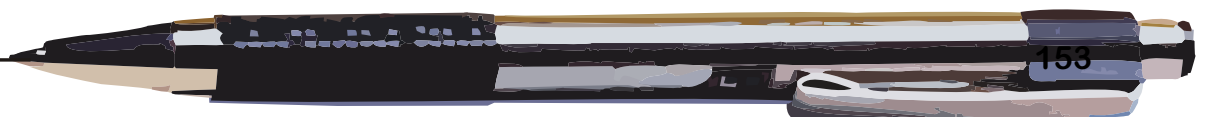
$\text{Job Site cfm} = \text{rated cfm} \times 2/3$



$\# \text{ of NAMs} = \text{Volume} \div \text{Job Site cfm}$



Add 1 backup NAM



Solve:

Room = 75' x 75' x 20'; Rated cfm = 3000 cfm

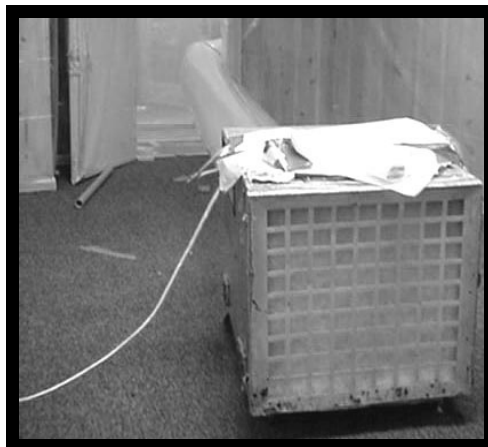
Step 1:

Step 2:

Step 3:

Step 4:

Step 5:



- AA -
Acronym Activity

SAR

APR

AHERA

ACM

CL

f/cc

EPA

GFCI

HVAC

OSHA

O&M

MSDS

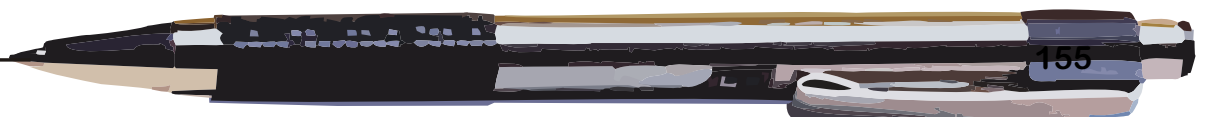
QFT

QNFT

PLM

PFT

PEL



PCM _____
PAPR _____
TEM _____
SCBA _____
CL _____
RACM _____
NESHAP _____
DOT _____
NAM _____
VAT _____
NIOSH _____
TWA _____
NEA _____
MUC _____
CFR _____
PACM _____
TSI _____
HEPA _____

