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

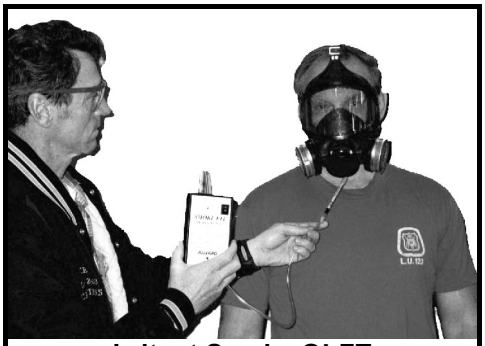
There are many different sizes and shapes of faces. **No one respirator will fit everyone.** The employer must have a selection of respirators for you to choose from.

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**


Irritant Smoke QLFT

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**


Bitrix


Saccharin


Banana Oil

Oil. Each substance has it's 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 area called **HEPA (H**igh **E**fficiency **P**articulate **A**ir**)** 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.

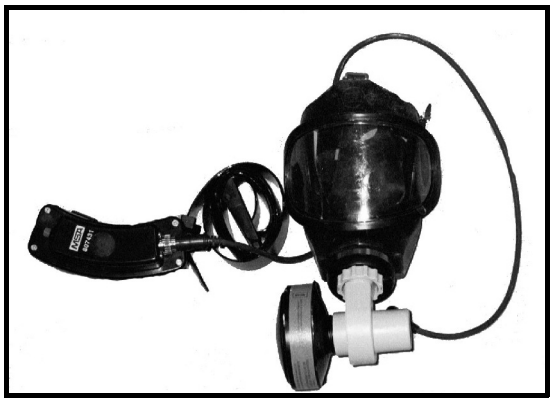
Full-Face APR – Good up to 5 f/cc

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 loose 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.

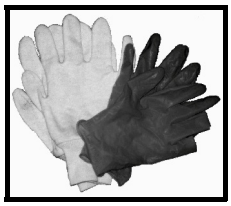
If you wear disposable clothing, you will put on a clean suit each time you enter the work area. The suit will either be one-piece or a suit with a detachable hood. The suit is usually made of paper for protection from asbestos, or a plastic-like material for protection against other chemicals. These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