



THE UNIVERSITY OF ALABAMA®

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Environmental Health and Safety

Dual Cartridge

Respirator Protection Training



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Medical Reasons That **Could** Prohibit the Use of a Respirator

- A history of pulmonary or lung problems such as:
- Asbestosis, asthma, COPD, emphysema, TB, silicosis, shortness of breath, etc.
- Do not use a respirator if you have any health or respiratory problem until you obtain clearance from a Physician or other Licensed Health Care Professional.



Other Reasons Not to use a Respirator

- Beards, stubble, or sideburns will prevent a good facepiece seal. **Do not** use any respirator unless you are clean-shaven.
- **No** exception to this rule
- If you have facial hair, you will **not** be fit tested



Who uses respirators?

- An estimated 5 million workers are required to wear respirators in 1.3 million workplaces throughout the United States. Respirators protect workers against insufficient oxygen environments, harmful dusts, fogs, smokes, mists, gases, vapors, sprays and biological hazards. These hazards may cause cancer, lung impairment, other diseases, or death.



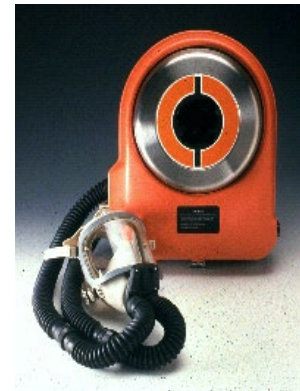
If Worn Properly

- An air purifying respirator will reduce, but not eliminate the inhalation of contaminants.
- Does not supply oxygen.
- Does not totally eliminate exposure to or risk of contracting any disease or infection.

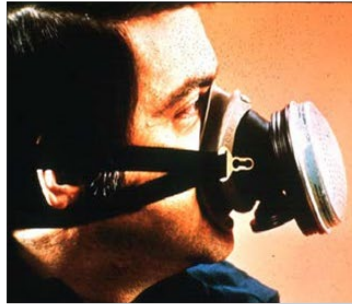


Selection of Respirators

- Employer must select and provide an appropriate respirator based on the respiratory hazards to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.



Tight-Fitting Coverings



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Loose-Fitting Coverings



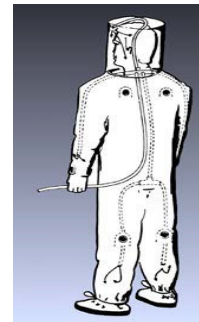
Hood



Helmet



**Loose-Fitting
Facepiece**



**Full Body
Suit**

Negative Pressure Respirator

- A respirator in which the air pressure inside the facepiece is **negative during inhalation** with respect to the ambient air pressure outside the respirator.



Filtering Facepiece (Dust Mask)

- A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium



Air-Purifying Respirator (APR)

- A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.



Your Respirator

- EHS recommends the MSA and Moldex Half-face Dual Cartridge respirators. They come in small, medium, and large sizes. We maintain a supply of parts, cartridges, and respirators for most situations.



MSA Advantage 420

- Lightweight silicone construction
- Comfortable
- User friendly
- Fits a variety of face shapes and sizes
- Cartridges available for a wide range of contaminants



Moldex Series 7000

- Lightweight silicone construction
- Comfortable
- User friendly
- Fits a variety of face shapes and sizes
- Cartridges available for a wide range of contaminants



Assigned Protection Factor (APF)

- The workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified in this section.



Assigned Protection Factors (APF's)

Must use the APF's listed in Table 1 to select a respirator that meets or exceeds the required level of protection

When using a combination respirator (e.g., airline with an air-purifying filter), must ensure that the APF is appropriate to the mode of operation in which the respirator is being used



ASSIGNED PROTECTION FACTORS

TYPE OF RESPIRATOR	QUARTER MASK	HALF MASK	FULL FACEPIECE	HELMET/HOOD	LOOSE-FITTING FACEPIECE
1. Air-Purifying Respirator	5	10	50	---	---
2. Powered Air-Purifying Respirator (PAPR)	---	50	1,000	25/1,000	25
3. Supplied Air Respirator (SAR) or Airline Respirator					
• Demand mode	---	10	50	---	---
• Continuous flow mode	---	50	1,000	25/1,000	25
• Pressure-demand or other positive pressure mode	---	50	1,000	---	---
3. Supplied Air Respirator (SAR) or Airline Respirator					
• Demand mode	---	10	50	50	---
• Pressure-demand or other positive pressure mode (e.g. open/closed circuit)	---	---	10,000	10,000	---

Prior to use

- A written respiratory program must be implemented
- User must be medically fit to use a respirator
- Have had adequate training for the hazard they are to be subjected to
- Must be trained in the use of intended respirator
- Must be fit tested



Prior to donning respirator

- Select the appropriate size, a medium fits most people. Only a secure snug fit protects you, so make sure you have the correct size. The shape of your face, facial hair and condition of your skin can affect your fit.
- Inspect the respirator for defects.

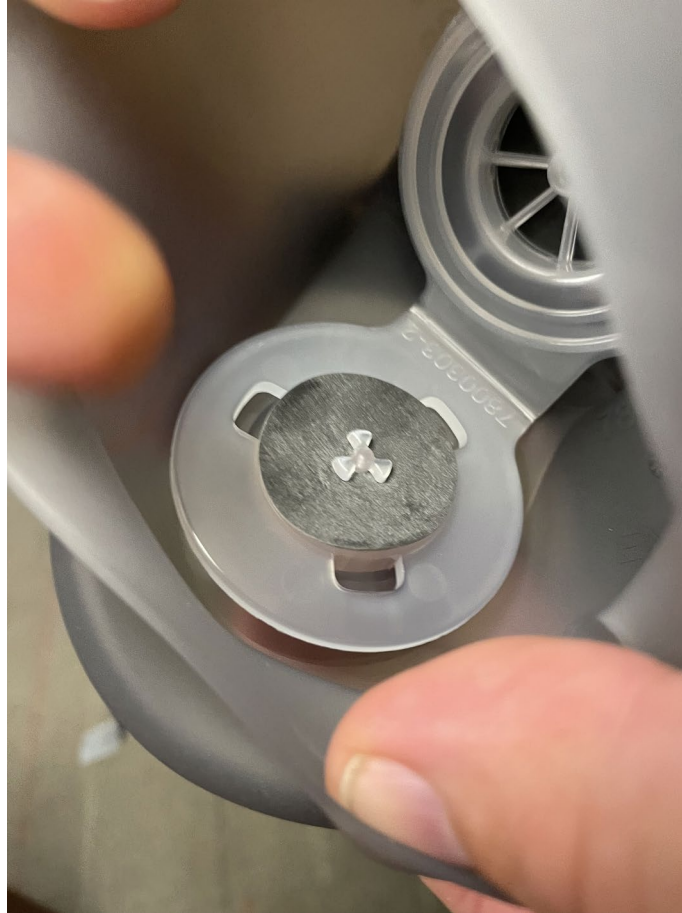


Respirator Parts

- Facepiece
- Exhalation valve
- Inhalation valve
- Straps



Inhalation Valves



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Exhalation Valve



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Determine the adequacy of the respirator fit:

- Chin properly placed;
- Adequate strap tension, not overly tightened;
- Fit across nose bridge;
- Respirator of proper size to span distance from nose to chin;
- Tendency of respirator to slip;
- Self-observation in mirror to evaluate fit and respirator position.



Donning the Respirator

- Connect bottom strap around your neck.
- With one hand, hold the respirator to your face.
- While holding the respirator in place, slip the head harness over your head.
- Adjust and tighten the head harness straps until the respirator fits snugly to your face. The best way to tighten a respirator is to tighten the straps from the bottom up. To be sure that you know how to don the respirator properly, you should demonstrate donning the respirator to your supervisor or safety professional.



A properly donned dual cartridge half face facepiece.

- To be properly donned, the respirator must be correctly oriented on the face and held in position with both straps. The straps must be correctly placed, with the upper straps high on the head and the lower strap below the ears. For persons with long hair, the lower strap should be placed under (not over) the hair.



RESPIRATOR FIT CHECKS

- Perform both a Positive Pressure Seal Check and a Negative Pressure Seal Check



Positive Pressure Seal Check

- Begin by closing the respirator's exhalation valve by covering it with your hand, then breathe out slowly. The facepiece will bulge out slightly. Hold your breath for about 10 seconds. If during this time no air leaks from around the facepiece, you know you have a good fit. If you do not have a good fit, readjust the head harness straps, and repeat the pressure test.



Negative Pressure Seal Check

- Begin by closing the respirator's inhalation valves with your hands, then breathe in slowly.
- The facepiece will collapse slightly. Hold your breath for about 10 seconds. And if during this time no air leaks in from around the facepiece, you know you have a good fit. If you do not have a good fit, readjust the head harness straps, and repeat the pressure test.



Respiratory Fit Test

- A qualitative fit test (yes it fits or no it does not fit) is used.
- Dependent on the detection of a saccharin (sweet) tasting mist or a bittrex (bitter) tasting mist.



What is done?

Sensitivity Test

- This test is done to assure that the person being tested can detect the sweet or bitter taste of the test solution at very low levels. The Sensitivity Test Solution is a very dilute version of the Fit Test Solution. The test subject should not eat, drink, or chew gum for 15 minutes before the test.



Sensitivity Test

- The test hood is placed over the subject's head (without the respirator on) and the sensitivity solution is misted inside to make sure the subject can detect the test solution.



Next

- The subject dons the respirator, the hood is again placed over the head and the Fit Test Solution (a very concentrated saccharin solution) is misted into the hood.



And Last

- The subject is asked to perform several exercises, normal breathing, deep breathing, turning their head side to side and up and down. Finally they are asked to read the “Rainbow Passage”. If the test solution is not detected during these exercises the subject has a properly fitted respirator.



Monitoring Your Respirator

As you work, you must not only monitor the seal around your face, but you must also monitor how well your respirator is working. You will know that your respirator is not working when:

- You can smell or taste the contaminant
- Breathing becomes difficult
- You become dizzy or sick feeling
- The manufacturer's recommended service life of the filters or cartridges expires
- The respirator is damaged
- **WARNING:** Never use or continue to use a respirator that is not working perfectly.



Monitoring Your Respirator

After using your respirator, you should clean and inspect it. A mild soap and water solution is usually sufficient for cleaning, but a disinfectant should be used periodically also. As you clean, be sure to look for:

- Worn or frayed straps
- Worn or damaged fittings
- Broken buckles
- Improperly seated or cracked valves



Monitoring Your Respirator

- If you find ANYTHING wrong with your respirator, have it repaired or replaced immediately!
- NEVER knowingly use a malfunctioning or broken respirator or cartridge
- NEVER use parts or cartridges not specifically designed for use with your respirator
- Do not leave your respirator hanging from the straps for extended times



Storing Respirators

- After cleaning and thoroughly drying your respirator, place it in a sealable plastic bag away from:
 - Dust
 - Sunlight
 - Heat
 - Extreme cold
 - Moisture
 - Damaging chemicals



Cartridge Service Life

The problem is.....

- Cartridges designed for the Survivair 2000 respirator do not have an end-of-service-life indicator (ESLI), i.e. a colored area or spot on the cartridge that changes color to indicate the cartridge needs replaced.
- No one works in an area with a consistent level of contamination.



Cartridge Service Life

So.....

- Change cartridges at least yearly
- More often if you smell/taste the contaminant or breathing becomes difficult.

