Respiratory Protection Training

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Introduction

The University has established a respiratory protection program for the safety and health of its employees because not every working environment can be made completely safe from potentially hazardous substances and atmospheres through engineering controls. It is important that employees wear respiratory protection to prevent exposure to airborne hazardous substances.

Overview

This handbook will cover:

1. Respiratory Hazards.
2. Types of Respirators available.
3. Donning a Respirator.
4. Seal Check.
5. Respiratory Fit Testing.
6. Inspection Procedures.
7. Cleaning and Storage Instructions.

Respiratory Hazards

A respirator is used to remove specific air contaminants by passing ambient air through an air purifying element, filters, cartridges, or canisters.

Training and medical monitoring are a critical part of respirator use. Before you are allowed to wear a respirator on the job, you will receive and must pass a medical monitoring exam, receive initial training and fit testing. Annual training will follow.

Inhalation is the quickest way for contaminants to enter the bloodstream. That is why it is important to protect your respiratory system if you work in a contaminated atmosphere.

The atmosphere can be contaminated with a variety of hazards including dusts, smoke, fumes, spray, mists, gases, and vapors.

Dusts

These solid particles ranging greatly in size, are especially hazardous when they contain asbestos, toxic chemicals, silica, lead, vegetable fibers, etc.

Hazardous dusts are common during operations like grinding, milling, crushing, drilling, sanding, and blasting.

Smoke and Fumes

Smoke and fumes are produced when solids are heated during operations such as welding, smelting, and burning. Fumes may be impossible to see or smell.

Spray and Mists

Dangerous sprays occur when small liquid droplets are sprayed or mixed (for example, during paint spraying or metal cleaning operations). Hazardous mists may be formed when liquids are evaporated or distilled, and when chemical reactions occur.

Oxygen Deficiency

Enclosed areas that don't have enough oxygen are an immediate threat to life. This can happen when oxygen is depleted by a chemical reaction (for example, when something burns), when oxygen is intentionally replaced by another gas (for example, to retard spoilage in fruit storage areas), or when oxygen is displaced by a heavier gas or vapor. This is known as oxygen deficiency.

Oxygen deficiency exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent.

Gases and Vapors

These are molecules suspended in the air. The air around you could be contaminated by harmful (but invisible) gases and vapors such as hydrogen chloride, ammonia, propane, etc.

Some processes that use high temperatures (like welding) can involve reactions that change harmless elements into toxic gases. For example, nitrogen and oxygen may become toxic nitrogen oxides.

Types of Respirator Protection

When engineering controls are not feasible, you may be required to wear a respirator for your protection. The respirator you wear depends on the type of hazard you encounter.

Dust Masks

Dust masks are great for general purpose protection against dust and odors. Please follow the chart in Appendix A to determine which dust mask is most suitable for your job.

There are two types of dust masks available on campus:

- General Dust and Odor Control
- General Dust Control in an oily environment

Keep in mind that dust masks cannot be used in an oxygen deficient atmosphere (e.g. confined space) or where there are chemical hazards.

Half Facepiece Air Purifying Masks

The Half Facepiece Air Purifying Respirators are designed to help provide respiratory protection against certain airborne contaminants. There are a variety of respirators available at CSUF.
The half facepiece respirator does not supply oxygen in air-purifying mode. Do not use in atmospheres containing less than 19.5 % oxygen.

A Half Facepiece Air Purifying Mask can be equipped with High Efficiency Particulate Air (HEPA) filter elements, except for those used in areas where the potential hazard is not particulate. HEPA filters protect against asbestos and low concentrations of radioactive and toxic particulates.

A Half Facepiece Air Purifying Mask can be equipped with cartridges or filters to block airborne contaminants. Cartridges are preferably used to remove specific contaminants from the air (Organic vapor, acid gas, ammonia, etc.).
Filters are used to remove solid or liquid aerosols.

When you are not sure on the type of filter you need to use contact your supervisor, use the matrix, or call EH&IS at extension 7233.

Cartridge Assembly

1. Align cartridge notch with facepiece mark, and push together. (Figure 1)

2. Turn cartridge clockwise to stop (1/4 turn). (Figure 2)

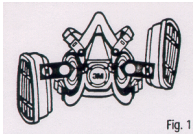


Fig. 1

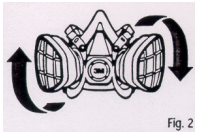


Fig. 2

Type of Filters

The three type of filters available are:

- Organic Vapor/Acid Gas (Yellow)
- Organic Vapor/Acid Gas/HEPA (Yellow/Magenta)
- HEPA P-100 (Magenta)

The filter you will use is determined by the type of hazard to which you will be exposed. Use the respirator selection chart in Appendix A.

Full Facepiece Respirator

Full-face mask respirators provide more protection than half-facepiece masks because their shape allows a better mask-to-face seal. They also protect the eyes from irritating chemicals or particulate atmospheres.

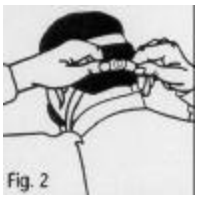
Full-facepiece masks come equipped with selective types of air-purifying canisters, dependent upon the protection required.

Donning a Respirator

1. Place respirator over your mouth and nose, and then pull head harness over crown of your head. (Figure 1)

2. Take bottom straps in both hands, place them in back of your neck, and hook them together. (Figure 2)

3. Position facepiece low on the bridge of your nose for optimal visibility and best fit.



4. Adjust top straps first, and then lower neck straps by pulling on ends. DO NOT pull too tight! Pushing out on backside of buckles may decrease Strap tension.Perform a positive pressure and/or negative pressure user seal check. The positive pressure method is recommended. (Figure 3)

It is important to have even tension for both top and bottom straps. Straps that are too tight on either strap could cause the respirator to have a poor seal. If you cannot achieve a proper fit, DO NOT enter contaminated area. See your supervisor.

Seal Check

Always check the seal of the respirator on your face before entering a contaminated area. You should always conduct a positive and negative pressure test prior to using a respirator.

Positive Pressure

1. Place the palm of your hand over the exhalation valve cover and exhale gently. If the facepiece bulges slightly and no air leaks are detected between your face and the facepiece, a proper fit has been obtained.

2. If face seal air leakage is detected, reposition respirator on your face and/or readjust tension of the elastic straps to eliminate leakage.

3. Repeat above steps until a tight face seal is obtained.

If you cannot achieve a proper fit, DO NOT enter the contaminated area. See your supervisor.

Negative Pressure

1. Place palms of hands to cover face of the cartridge to restrict airflow.

2. Inhale gently and hold breath for 5 seconds. If you feel the respirator collapse slightly and pull closer to your face with no leaks between the face and the respirator, a proper fit has been obtained.

3. If face seal air leakage is detected, reposition respirator on face and/or readjust tension of straps to eliminate air leakage. Repeat above steps until a tight face seal is obtained.

If you cannot achieve a proper fit, DO NOT enter the contaminated area. See your supervisor.

Respiratory Fit Test

Before conducting a fit test using a respirator, every employee is required to receive a medical evaluation to determine his/her ability to safely use a respirator.

There are many factors that can prevent a good, safe fit: Facial stubble, beards, low hairlines, glasses, and goggles.

Respirators rely on a face-to-mask seal for complete protection from hazardous atmospheres. Fit testing is required to assure a proper fit. Facial hair which interferes with the seal of the respirator is absolutely not allowed.

When respirators are first issued, select one that feels comfortable. Follow instructions during fitting tests to be sure it will protect you.

There are two types of fit-testing: qualitative and quantitative.

Qualitative

Qualitative (pass/fail) tests are fast, require no complicated, expensive equipment, and are easily performed. However, they depend on the wearer's response, and thus are not entirely reliable.

In a qualitative testing, a challenge agent (vapor, smoke, or aerosol) is released around the respirator wearer. Fit is considered inadequate if the wearer detects the presence of the challenge agent through odor, taste, or nasal irritation.

Quantitative

Quantitative fit-testing measures the actual level of a challenge agent both outside and inside the respirator facepiece.

It is important to perform a fit test every year because proper fit can be affected by changes in facial structure, weight loss, or surgery.

Before you enter a hazardous atmosphere always check your respirator's fit and perform a negative and positive pressure test.

Inspection Procedure

The respirator should be inspected before each use to ensure that it is in good operating condition. The respirator should be disposed of if damaged or defective parts are found:

- Check the respirator for cracks, tears, and dirt. Be certain the respirator, especially face seal area, is not distorted.
- Examine inhalation and exhalation valves for signs of distortion, cracking or tearing. Ensure the valves are seated flatly on the holder.
- Make sure that head straps are intact and have good elasticity.
- Examine all plastic parts for signs of cracking or fatiguing. Make sure filter gaskets are properly seated and in good condition.
- Remove exhalation valve cover and examine exhalation valve and valve seat for signs of dirt, distortion, cracking or tearing. Replace exhalation valve cover.

IF ANY OF THE ABOVE CONDITIONS EXISTS, TURN YOUR RESPIRATOR IN AND GET A NEW ONE.

Cleaning and Storage Instructions

Cleaning is recommended after each use. Proper cleaning will prolong the quality of its performance.

1. Remove cartridges and/or filters.

2. Clean the respirator with wipes or by immersing in warm not hot cleaning solution and scrub with soft brush until clean. Add neutral detergent if necessary. Do not use cleaners containing lanolin or other oils.

3. Disinfect the respirator by soaking in a mild bleach solution or other disinfectant.

4. Rinse in fresh, warm water and air dry in a non-contaminated atmosphere.

5. Respirator components should be inspected prior to each use. A respirator with any damaged or deteriorated components should be discarded.

6. The cleaned respirator should be stored away from contaminated areas when not in use.

Always store the respirator where it can be protected from dust, sunlight, heat, cold, moisture, and chemicals.

Summary

Every employee is required to see a physician before using a respirator and obtain a physical exam to determine if the employee has respiratory problems, circulatory problems, or minor facial abnormalities.

Not everyone can wear a respirator. Tell your supervisor and check with a physician if you have a condition that might prevent you from safely using a respirator.

Always take the time to read the instructions included with the respirator for proper use and maintenance. Your life and health depend on it.

Appendix A: Respiratory Selection

Job Categories	Type of Respirators	Type of Filters
Animal Care Worker	1 = Potential exposure to pathogens. 7 = General dust and odor control	B F
Art Technician	1 = Potential overexposure to toxic chemicals and vapors. 7 = General dust and odor control	C F
Auto Shop Mechanic	1 = During asbestos brake changeout operation. 7 = General dust and odor control	B G
Bldg. Service Engineer; Refrigeration Mechanic	1 = Potential overexposure to toxic chemicals and vapors. 7 = General dust and odor control in an oily condition	C G
Chem/Bio/Physics Technicians	1 = Potential overexposure to toxic chemicals and vapors. During welding operations on stainless steel. 7 = General dust and odor control in an oily environment	C B G
Custodian	7 = General dust and odor control	F
Groundsworker	7 = General dust and odor control	F
Painter	1 = Spray painting opertions. 7 = General dust and odor control.	C G
Pesticide Applicator	1 = Potential overexposure to toxic pesticides. When applying in confined areas with limited ventilations.	D
Police Officer	7 = General dust and odor control 7 = General dust and odor control in an oily environment	F G
Skilled Laborer; Building Maintenance; Carpenter	1 = Potential overexposure to toxic chemicals During asbestos abatement operations. 7 = General dust and odor control.	C B F
Theater Technician	1 = Potential overexposure to toxic chemicals 7 = General dust and odor control.	C F
Tree Trimmers	7 = General dust and odor control.	G
Emergency Response Team	1 4 2 5 3 6	D,F,G

1 = Half Face	5 = Hood with PAPR
2 = Full Face	6 = Pressure Demand SCBA
3 = Half Face PAPR	7 = Dust Mask
4 = Full Face PAPR	

A = Organic Vapor (Black)	E = Ammonia (Green)
B = HEPA (Magenta)	F = 8210 (N-95, General Dust)
C = Organic Vapor/Acid Gas (Yellow)	G = 8271 (P-95, Dusty, Oily Environment)
D = OV/Acid Gas/HEPA (Yellow/Magenta)	