

UCSD Respiratory Protection Program

Administered by Environment, Health and Safety

I. Introduction

It is the policy of the University of California, San Diego to maintain, insofar as it is reasonably within the control of the University to do so, an environment that will not adversely affect the health, safety, and well-being of students, employees, visitors, and neighboring human populations.

Because of the potential risks involved from exposure to hazardous substances in the workplace, UCSD provides necessary respiratory protection equipment, and develops operational procedures for those employees who are required to use the equipment. All activities involving the use of respiratory protection equipment in facilities controlled by UCSD are conducted in compliance with Title 8 of the California Code of Regulations (CCR). The UCSD Respiratory Protection Program establishes procedures and requirements to meet various enforcing agencies' regulations for use of respiratory protection equipment, and provides the necessary health and safety protection to those persons falling within the jurisdiction of the program.

Your health depends upon breathing clean air. In some shops, vessels, labs, medical facilities, and maintenance environments the air may at times become contaminated with materials that are hazardous to breathe. The UCSD Respiratory Protection Program establishes guidelines for the use of respirators to protect the health of employees who, during their normal duties, are or could be exposed to hazardous substances or atmospheres.

II. The Respiratory Protection Program

A. Hazards to the Respiratory System

Your body's respiratory system is constantly working to cleanse and purify the air you breathe. Some occupational activities and/or environments require the extra protection of equipment specifically designed to protect against hazards that may enter the body through the nose and mouth when a person breathes. Like clean air, many of these hazards that may enter the body through the nose and mouth when a person breathes. Like clean air, many of these hazards are invisible and odorless. Breathing (or respiratory) hazards include dusts, fumes, mists; gases and vapors; oxygen deficient atmospheres and temperature extremes. Knowing the characteristics of each hazard helps to understand why respiratory protection is so important.

Dusts, Fumes, and Mists – are tiny particles that float in the air. **Dusts** are formed when solid materials are broken down in activities such as sanding, grinding, milling, and crushing operations. **Fumes** occur when metal is melted, vaporized, and then quickly cooled, creating very fine particles that drift in the air. Welding and furnace work are likely to produce fumes. **Mists** are tiny liquid droplets usually created by spraying, mixing, or cleaning activities. Mists may be a combination of several hazardous ingredients. When hazardous dusts, fumes, or mists are breathed in, they become trapped in the respiratory system and can cause irritate your respiratory system and cause short- or long-term health problems or even death.

Gases and Vapors – are invisible contaminants mixed in the air. Gases are often produced by chemical processes and high-heat operations. They drift quickly and undetected from their source. Gases are normally in a gaseous state at room temperature. **Vapors** are formed when liquids or solids evaporate, typically occurring with solvents, paints, or refining activities. Vapors are usually liquid at room temperature.

Oxygen Deficiency – is a lack of oxygen in the air. Oxygen deficiency can be caused by chemical reactions, fire, or displacement by other gases. In confined spaces, where ventilation is very limited or non-existent, aerobic bacterial growth and oxidation of rusting metals can also cause an oxygen deficient atmosphere. Oxygen comprises only a small percentage, about 21% of the air we breathe. Yet, when levels of oxygen fall below 19.5% (minimal acceptable level), life-threatening health problems begin to occur very quickly. Oxygen deficiency is a very serious situation that can cause loss of consciousness or death in minutes.

Temperature Extremes - are extremely hot or extremely cold air can damage the respiratory system, depending on the length of exposure. Activities involving high-heat furnaces and walk-in freezers are subject to this hazard.

B. UCSD's Respiratory Protection Program

UCSD's Respiratory Protection Program is administered by the Office of Environment, Health & Safety (EH&S). The program endeavors to control occupational diseases caused by breathing contaminated air. Job sites and tasks where workers may be exposed to breathing hazards are carefully evaluated by EH&S Industrial Hygienists to determine if respiratory protection is needed and what type.

EH&S has three approaches to achieving respiratory protection: The first method of protection is local engineering controls such as fume hoods or exhaust systems – the most effective and efficient means of protecting employees from on-site breathing hazards. Secondly, EH&S recommends administrative controls; these include substituting less toxic materials if possible, reassessing the task to see if exposure can be minimized or eliminated, and the possibility of job rotation to reduce the exposure of any one person to acceptable levels. Third: when the first two methods are not feasible, not yet in place, or cannot provide adequate protection, personal protection equipment is necessary.

C. Who Must Wear Respiratory Protection Equipment?

Respiratory protection equipment is required:

- For activities that cannot be safely controlled by engineering methods (pesticide application, for example, require the portability of a respirator).
- When the working atmosphere is or may be oxygen deficient (confined spaces such as tanks, boilers, vaults, crawl spaces, and storm drains are examples).
- When airborne radioactive or toxic materials could exceed acceptable limits.
- For emergency use when loss of life or serious property loss or damage may be involved.

Only those persons who have been designated by their supervisor, principle investigator, or EH&S as being required to utilize respiratory protection equipment, and who have been medically approved, properly fitted, and trained in its use, are authorized to utilize such equipment.

D. How Do You Obtain Respiratory Protection Equipment?

If you feel like you may need a respirator for your work, first consult with your supervisor and then submit a [Hazard Evaluation Form](#) online to be reviewed by EH&S.

An Industrial Hygienist will evaluate your workplace activities to determine the most effective and efficient means of respiratory protection for your circumstances. If it has been determined that a respirator is necessary, you must satisfactorily complete all requirements before respirator can be issued. These requirements include medical approval, adequate training, and respirator fit testing.

When these qualifications have been met, a new respirator will be issued. These same requirements must be repeated annually. The appropriate type of respirator will be selected by utilizing the Respiratory Equipment Selection Guide and the American National Standards Institute-Practices for Respiratory Protection (ANSI Z88.2). The costs will be recharged to the employee's administrative unit. Procedures for Obtaining Respiratory Protection Equipment, provides a step-by-step guide to the application procedure.

E. Medical History Questionnaire

Each employee whose duties require the use of a respirator will be asked to fill out a Medical History Questionnaire. Once it is reviewed and approved by the Occupational & Environmental Medicine, the employee will be scheduled for a respirator fit test and training. Employees who are medically denied will not be issued a respirator, and additional referral to the occupational health physician may be required.

F. Education and Training

Before a respirator is issued, EH&S will provide instruction on the use and limitations of respiratory protection. Training topics include: use and limitations, function of the respirator, how to don and doff, how to perform seal checks, cleaning, maintenance, and storage. Pertinent State and Federal regulations, as well as campus policies, will also be discussed.

The length of these instruction sessions vary with the type of equipment being described. More time is needed to train personnel who may use equipment in IDLH atmospheres (atmospheres that are immediately dangerous to life and health) than would be necessary for nuisance dusts, which would be a minimal hazard. Additional site specific training may also be necessary.

G. Procurement of Respirators

EH&S evaluates and approves the purchase of respiratory equipment before it is used. Selection is dependent upon the type and concentration of the contaminant. Each air purifying respirator issued is equipped with a filter and/or cartridges for protection against specific contaminant(s). Criteria for the selection and fitting of respirators is in accordance with the Respiratory Equipment Selection Guide and the American National Standards Institute-Practices for Respiratory Protection (ANSI Z88.2).

Respiratory protection equipment such as powered air-purifying respirators, air-supplied sandblast hoods, air-supplied plastic hoods, and others, may only be purchased upon approval by EH&S. Emergency needs are also processed through EH&S.

III. Maintenance and Care of Respirators

A. Employee's responsibilities

Primary responsibility for maintaining the respirator in proper and clean condition rests with the employee.

1. Maintenance

Before each use, carefully inspect the respirator for defects, signs of wear, or damage. This may include loose straps, dents or cracks, and broken fittings. Make sure the respirator is clean before you put it on. Contact EH&S for replacement parts.

2. Disinfection

After each use, disinfect your respirator according to the manufacturer's instructions. Remember to clean the inside first before the outside to avoid cross contamination.

3. Storage

Protect your respirator and cartridges from dirt and damage by storing them in a bag or container. Containers should

4. Cartridges

The service life of a cartridge can depend on many factors such as environmental conditions, cartridge filtering capacity, the contaminant concentration, length of exposure time, and user's breathing rate. Write the date on new cartridges so you know when you started using them and keep track of how long you have used them. To determine cartridge change-out schedule, first check with the cartridge manufacturer and its software to see if it is equipped with an end-of-service-life (ESLI) certified by NIOSH for the contaminant. Some indicators that cartridges need to be replaced are:

- a. If the cartridges are damaged or extremely dirty
- b. If you have restricted breathing
- c. If there is a sudden breakthrough in the cartridge. A tell-tale sign is the ability to smell the odor of the contaminant while using a chemical cartridge. Cartridges should be replaced before this occurs.

If you smell the contaminant while wearing the respirator, leave the area and check either the seal of the respirator or replace the cartridges before re-entering the area.

5. Notify EH&S at ehsih@ucsd.edu if you need replacement cartridges or no longer need a respirator. Return the respirators to EH&S at mail code 0958. A respirator must be returned to EH&S if any of the following conditions are met:
 - a. It is no longer needed
 - b. It malfunctions or is damaged
 - c. The employee's employment at UCSD is terminated
6. Inspect and examine all SCBA units at least monthly to ensure proper operation. Document the inspections.

B. EH&S Responsibilities

1. Annually inspect respirator for defective parts.
2. Replace and reissue broken or malfunctioning respirators

IV. Program Responsibilities

A. Employee Responsibilities

UCSD employees or persons enrolled in the Respiratory Protection Program for use of respiratory equipment is responsible for

1. Use only brands and types of respirators for which they have been trained and fitted by EH&S. Only use the respirator for the specific tasks that the respirator was issued to the employees.
2. Inform supervisor if there are any issues with the use of the respirator.
3. Guard against damage and ensuring respirators are not disassembled, modified, or otherwise altered in any way other than the changing of respirator cartridges or filters.
4. Report any observed or suspected malfunctioning respirator to EH&S.

5. Bring used respirators and cartridges to EH&S to be exchanged for a new or cleaned and reconditioned unit.
6. Update respirator use certification annually by completing the medical history questionnaire, fit testing, and training.

C. Principle Investigator, Supervisor, or Division Head Responsibilities

Each person in charge of a research project or other activity where respiratory protection equipment is used is responsible for:

1. Identifying, with the assistance of EH&S, those employees who may need respiratory protection equipment; scheduling them for medical evaluation, fit testing, and training in the proper use and maintenance of the equipment.
2. Requesting assistance from EH&S in evaluating operations that may present health and safety hazards requiring the use of a respirator.
3. Informing EH&S and contacting the Occupational Health Center for medical approval before assigning known or suspected medically restricted employees to jobs requiring the use of respirators.
4. Enforcing the use of respiratory protection equipment and other requirements when applicable.

D. EH&S Responsibilities

1. Provide centralized facility for purchasing, maintaining, and evaluating respiratory equipment needed and used by UCSD employees.
2. Provide instruction on the need for respiratory protection; criteria for selecting respirators; and respirator fitting, use, and maintenance.
3. Conduct initial, annual, and other required respirator fit testing.
4. Facilitate initial and annual medical approval.
5. Provide initial and annual training on respirator use and limitations.
6. Conduct inspections for respirator equipment usage, maintenance, and storage.
7. Maintain records of fit test results, training classes, and medical approvals.