



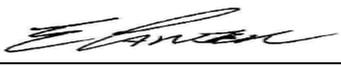
ENVIRONMENTAL HEALTH & SAFETY

Administrative Policy

Respiratory Protection Program

Source: Environmental Health and Safety

Prepared by: Alison M. McGrath, MS, CIH 
Research and Industrial Hygiene, Environmental Health and Safety

Reviewed by: Ethan Carter, Ph.D. 
Director, Environmental Health and Safety

Effective Date: October 1, 2016

Applies: Denver Campus and Anschutz Medical Campus

INTRODUCTION

The University of Colorado Denver | Anschutz Medical Campus (UCD) Respiratory Protection Program (RPP) outlines the institutional requirements for respiratory protection. It is intended to provide program procedures, information, and guidance that is consistent with the Occupational Safety and Health Administration (OSHA) standards. UCD administration is concerned not only with meeting the federal and state regulations, but also with maintaining employee health. This document is established to detail the proper use of protective respiratory equipment as deemed necessary to:

- Reduce exposure to airborne hazardous agents.
- Allow for safe work and research in areas that contain hazardous agents.
- Ensure the safety of all individuals enrolled in the UCD RPP.



TABLE OF CONTENTS

INTRODUCTION1

TABLE OF CONTENTS.....2

POLICY STATEMENT3

DEFINITIONS3

DESIGNATION OF PROGRAM ADMINISTRATOR6

SUPERVISORS OF UCD EMPLOYEES AND AFFILIATES.....6

UCD EMPLOYEES AND AFFILIATES6

SELECTION OF RESPIRATORY PROTECTIVE EQUIPMENT7

PROCEDURES FOR REQUESTING RPP ENROLLMENT OR SERVICES FROM UCD-EHS:.....9

MEDICAL ASPECTS OF RESPIRATORY EQUIPEMENT USAGE.....9

FIT TESTING PROCEDURES FOR RESPIRATORY PROTECTION EQUIPMENT.....9

RESPIRATORY PROTECTION EQUIPMENT MAINTENANCE.....10

TRAINING12

PROGRAM EVALUATION13

COST ASSOCIATED RESPIRATORY PROTECTION PROGRAM SERVICES.....13

APPENDICES.....13

- Appendix 1 OSHA Respiratory Protection Standard (29 CFR 1910.134)
- Appendix 2 OSHA Appendix B-2 (Respirator Cleaning Procedures) to 29 CFR 1910.134
- Appendix 3 OSHA Appendix D (Voluntary Respirator Use) to 29 CFR 1910.134
- Appendix 4 Respirator Medical Evaluation Questionnaire
- Appendix 5 Initial Respirator Clearance Form
- Appendix 6 Annual Respiratory Protection Clearance Form
- Appendix 7 Respiratory Protection Acknowledgement Form
- Appendix 8 Key Differences Among Respirators
- Appendix 9 Employee Respiratory Protection Program Evaluation Form
- Appendix 10 PAPR User Fact Sheet



POLICY STATEMENT

This document is applicable to all University of Colorado Denver | Anschutz Medical Campus (UCD) employees and affiliates, including but not limited to students, volunteers, or interns that perform tasks requiring the use of respiratory protection; moreover, this document applies to tasks performed by the aforementioned individuals on UCD campuses, in UCD facilities, or at other locations where work falls within the scope of job duties required for their position with the university. Following the procedures outlined in this policy will minimize exposure to airborne concentrations of hazardous substances and infectious agents. While UCD administration is concerned with meeting the federal and state regulations, maintaining the health of the UCD academic, research, facilities, and first responder community is of utmost importance. Because the university is a state institution to which Federal OSHA regulations do not apply, UCD shall follow OSHA regulation 29 CFR 1910.134 (Appendix 1) *as a guide*.

This policy does not apply to: UCD contractors; UCD visitors; University of Colorado Hospital employees; or anyone who hires EHS to conduct their medical clearance, training, and/or fit testing. These services may be provided as a contracted service to those who do not fall under the UCD RPP. Anyone who does not fall under the UCD policy will be notified that they do not fall under the UCD RPP and will fill out the Respiratory Protection Acknowledgement Form (Appendix 7). Anyone who is not a part of the UCD RPP is expected to follow OSHA requirements at a minimum when utilizing respiratory protection in affiliation with UCD.

Individuals who *voluntarily* wear a respirator when a respirator is *not required* are subject to the medical evaluation, cleaning, maintenance, and storage elements of this program, and must be provided with the information contained in OSHA 29 CFR 1910.134 Appendix D (Appendix 3). However, individuals who voluntarily wear filtering facepiece respirators (e.g., N95 respirators) may not be subject to certain aspects of this policy, such as medical evaluation.

Individuals participating in the required RPP do so at no cost to them. The expense associated with training, medical evaluations, and respiratory protection equipment is borne by the institution, department, or program employing the individual worker (depending on the nature of the funding arrangement).

DEFINITIONS

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

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 by this section.

Atmosphere-supplying respirator: a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge: a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator: an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation: any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure: exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI): a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator: a respirator intended to be used only for emergency exit.



Filter or air purifying element: a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece: 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.

Fit factor: a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test: the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test and Quantitative fit test.)

High efficiency particulate air (HEPA) filter: a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood: a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH): an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Loose-fitting facepiece: a respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC): the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the APF of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the APF specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

Negative pressure respirator (tight fitting): a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere: an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP): an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator: a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR): an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator: a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT): a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT): an assessment of the adequacy of respirator fit by numerically measuring the amount



of leakage into the respirator.

Respiratory inlet covering: that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA): an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life: the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

This section: this respiratory protection standard.

Tight-fitting facepiece: a respiratory inlet covering that forms a complete seal with the face.

User seal check: an action conducted by the respirator user to determine if the respirator is properly seated to the face.



DESIGNATION OF PROGRAM ADMINISTRATOR

UCD EHS designates the Research Safety and Industrial Hygiene (RSIH) Manager as the Program Administrator responsible for the RPP at UCD. The RSIH manager is delegated the authority by the UCD EHS Director and UCD Vice Chancellor of Research to make decisions and implement changes in the RPP for all operations of the university.

The RSIH manager is charged with the following responsibilities:

1. Guidance and oversight for individual department respiratory protection programs at UCD.
2. Establish a respiratory selection procedure for UCD.
3. Establish training requirements for the RPP.
4. Review appropriateness of equipment and equipment specific training of respiratory protection used by employees and affiliates.
5. Establish a schedule for periodic inspection of those workplaces/conditions-requiring respiratory equipment-to determine exposure and/or changing situations.
6. Conduct evaluations of the above aspects to ensure the continued effectiveness of the program.

SUPERVISORS OF UCD EMPLOYEES AND AFFILIATES

Supervisors are responsible for ensuring that the RPP is implemented in their particular areas. In addition to being knowledgeable about the program requirements for their own protection, supervisors must also ensure that the program is understood and followed by the employees and affiliates under their charge. Duties of the supervisor include:

1. Ensuring that employees and affiliates under their supervision (including new hires) have received appropriate training, fit testing, and annual medical evaluations (if required).
2. Designate a point of contact, if necessary, to coordinate with EHS regarding fit testing procedures, scheduling, training, or other changes regarding the RPP.
3. Ensuring the availability of appropriate respirators and accessories.
4. Being aware of tasks requiring the use of respiratory protection.
5. Enforcing the proper use of respiratory protection when necessary.
6. Ensuring that respirators are properly cleaned, maintained, and stored according to the respiratory protection plan.
7. Ensuring that respirators fit well and do not cause discomfort.
8. Continually monitoring work areas and operations to identify respiratory hazards and notifying EHS of changing work conditions that may necessitate a change in respiratory protection used.
9. Coordinating with the Program Administrator to address respiratory hazards or other concerns regarding the program.

UCD EMPLOYEES AND AFFILIATES

Each individual who falls under the UCD RPP has the responsibility to wear his or her respirator when and where required and in the manner in which they were trained. Employees and affiliates must also:

1. Care for and maintain their respirators as instructed and store them in a clean, sanitary, and accessible work area.
2. Inform their supervisor if the respirator no longer fits well, and request a new one that fits properly.
3. Inform their supervisor or the Program Administrator of any respiratory hazards that they feel are not adequately addressed in the workplace and of any other concerns that they have regarding the program.

Individuals who do not fall under the UCD RPP who contracted services through EHS for medical clearance, training, and/or fit testing or who have acknowledged compliance to 29 CFR 1910.134 by signing the UCD Respiratory Protection Acknowledgement Form (Appendix 7) should also follow these best practices; however, there may be additional requirements depending on their RPP.



SELECTION OF RESPIRATORY PROTECTIVE EQUIPMENT

The Program Administrator will select respirators to be used on site, based on the hazard to which workers are exposed and in accordance with all OSHA standards. The Program Administrator or their designee will conduct a hazard evaluation (also referred to as a hazard assessment) for each operation, process, or work area where airborne contaminants may be present in routine operations or during an emergency. A brief summary of differences among various types of respirators can be found in Appendix 8.

Evaluation and Re-Evaluation of the Hazard

The hazard evaluation review will include:

1. Review that oxygen levels are acceptable to use any form of filtering respiratory protection (filtering facepiece respirators, elastomeric respirators, PAPRs, etc.);
2. Identification and development of a list of hazardous substances used in the workplace, by department, and/or work process;
3. The Safety Data Sheets (SDS) combined with application of contaminant and exposure level measurements (or knowledge) shall be used in the formation of a decision to implement the use of respiratory protection;
4. Review work processes to determine where potential exposures to these hazardous substances may occur. This review shall be conducted by surveying the workplace, reviewing process records, and talking with employees, affiliates, and supervisors;
5. Exposure monitoring, if necessary, to quantify potential hazardous exposure. Exposure surveys of employee groups and/or processes pertinent to university operations shall be conducted by the EHS Industrial Hygienist; and
6. Documentation of the hazard evaluation in the UCD RSIH Hazard Assessment Database.

Upon completion of the hazard evaluation UCD EHS Industrial Hygienist shall review the results to determine the feasibility of engineering and/or administrative control techniques. In addition, the Program Administrator is responsible for re-evaluating, revising, and updating the hazard assessment as needed (i.e. any time work process changes may potentially affect exposure).

Selecting Respiratory Protection

The result of the hazard evaluation is reviewed to determine the feasibility of engineering and/or administrative controls to eliminate the need for respiratory protection. If these controls are not feasible respirators must then be selected. All respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH) and shall be used in accordance with the terms of that certification. The choice of respirator type depends on the type of hazard and the level of protection needed as designated through the assigned protection factor (APF) needed.

Particulate Respirators

These respirators only protect against particles (e.g., dust, pathogens, animal dander). They do not protect against chemicals, gases, or vapors above nuisance level concentrations, and are intended only for low hazard levels. The commonly known "N95" filtering facepiece respirator is one type of particulate respirator, often used in hospitals to protect against infectious agents. However, elastomeric half face or full face respirators as Powered Air Purifying Respirators (PAPR) can be used with filters to provide particulate protection. Particulate respirators are "air purifying respirators" because they clean particles out of the air as you breathe.

Particulate respirators:

- Filter out dusts, fumes, and mists
- Are disposable dust masks, PAPRs, or elastomeric respirators with disposable filters
- Must be replaced when they become discolored, damaged, or clogged

There are N-, R-, and P-series particulate respirators and filters; proper respirator or filter selection depends on the presence or absence of oil particles:

- N indicates the respirator or filter is **Not** resistant to oil,
- R indicates the respirator or filter is **Resistant** to oil
- P indicates the respirator or filter is oil **Proof**



As such:

- If no oil particles are present in the work environment, use a filter of any series (i.e., N-, R-, or P-series).
- If oil particles (e.g., lubricants, cutting fluids, glycerin, etc.) are present, use an R- or P-series filter.
Note: N-series filters cannot be used if oil particles are present.
- If oil particles are present and the filter is to be used for more than one work shift, use only a P-series filter.

Particulate respirators and filters also have an efficiency rating; selection of filter efficiency (i.e., 95%, 99%, or 99.97%) depends on how much filter leakage is acceptable. Higher filter efficiency means lower filter leakage.

The choice of facepiece depends on the level of protection needed; that is, the assigned protection factor needed.

Chemical Protection

Air-purifying respirators can filter or clean chemical gases out of the air as you breathe. This type of respirator includes an elastomeric facepiece or mask, and a cartridge or canister. Straps secure the facepiece to the head. The cartridge may also have a filter to remove particles. PAPRs with specific chemical cartridges or canisters can also offer chemical protection.

Air-purifying respirators are only effective if used with the correct cartridge or canister (these terms may be used interchangeably) for a particular biological or chemical substance. There are cartridges available that protect against more than one hazard, but there is no "all-in one" cartridge. It is important to work with EHS to determine the appropriate filter, cartridge, or canister and change out schedule.

Chemical Cartridge or Respirator:

- Uses replaceable chemical cartridges or canisters to remove the contaminant
- Are color-coded based on the contaminate protection offered
- More than one cartridge may be needed to protect against multiple hazards

Powered Air Purifying Respirators (PAPRs) are positive pressure air purifying respirators that can be used for both particulate and chemical airborne hazards depending on the model or the filter, canister, or cartridge chosen to work with the unit. Specific groups are approved to wear PAPRs. Working with EHS is paramount to achieving acceptable protection to airborne contaminants using a PAPR.

There are several areas on campus where donning a PAPR has been designated as the appropriate respiratory protection, including:

- BSL-3: 3M Breathe Easy (stored in EHS office, Building 401)
- Facilities Management: 3M TR-600 (Ed1 SAB closet, Water Treatment staff, CUP); 3M GVP (PRF, Fluid Shop); and North Primair (building inspectors)
- OLAR: 3M Air-Mate

Each of these areas and PAPR models have different protocols in place for battery charging, airflow testing, and decontamination procedures, which have been determined in conjunction with EHS and are dependent on the potential exposure. If you are interested in using a PAPR or use a PAPR and need assistance in determining best practices, contact EHS. Additionally, EHS has developed a PAPR User Fact Sheet with an overview of safety topics related to PAPR use (Appendix 11).

Voluntary Respirator Use

Some departments within UCD provide respirators at no charge to employees or affiliates for voluntary use, or allow employees or affiliates to bring their own respirators to the university. Anyone wearing air purifying respirators shall be referred to Appendix D of 29 CFR 1910.134 and must undergo medical clearance. Anyone wearing filtering facepiece respirators that are constructed primarily of the filter material, such as N95s, are not required to undergo medical clearance; however, they shall be referred to Appendix D of 29 CFR 1910.134 and other aspects of the written RPP should be followed such as proper storage, maintenance, and change out of the respirator.



PROCEDURES FOR REQUESTING RPP ENROLLMENT OR SERVICES FROM UCD-EHS:

Individuals must follow the instructions below to enroll in the UCD RPP, which includes components of the OSHA Respiratory Protection Standard such as annual medical clearance, training, and fit testing.

1. When enrolling in the UCD RPP, the Respirator Medical Evaluation Questionnaire must be completed and reviewed by the UCD Occupational Health Program.
 - a. The Respirator Medical Evaluation Questionnaire (Appendix 4) is to be filled out by the employee or affiliate requiring the respirator. This is only required upon enrollment to the program.
 - b. The Initial Respirator Clearance Form (Appendix 5) is the form that is signed off by the Occupational Health Program noting that the employee or affiliate has been medically cleared to use a respirator on the UCD campus.
2. Once the Respirator Medical Evaluation Questionnaire and the Initial Respirator Clearance Form have been completed, they should be emailed to occupational.health@ucdenver.edu. Make a one-time appointment with the UCD Occupational Health Program by calling 303-724-9145.
3. Once the Health Clearance Form has been signed and approved, an EHS representative will contact the individual to schedule the respirator fit test.
4. The individual requiring the respirator must be trained on the proper use of the respirator prior to the fit test. The training may be taken prior to the completion of Items 1-3 of this section but must be completed after the selection of the respirator. Two respiratory protection trainings are available online through SkillSoft: "CU: N95 Respirator Safety" and "CU: Respiratory Protection"; however, if neither of the online trainings meet the needs of a particular individual or group of individuals, EHS can provide in person training.
5. Individuals who fall under the scope of this plan will be notified via email when their annual requirements are due. They must complete the Annual Respiratory Protection Clearance Form (Appendix 6) and email it, and the completion certificate from their online training to EHSRespirator.Fittest@ucdenver.edu. After these requirements are met, UCD EHS will contact individuals to schedule their annual fit test.

MEDICAL ASPECTS OF RESPIRATORY EQUIPEMENT USAGE

Employees and affiliates who are either required as part of their job function to wear a respirator or who choose to wear an APR (such as a half face or full face respirator) voluntarily, must complete the Respirator Medical Evaluation Questionnaire to be reviewed by the Occupational Health Program before being permitted to wear a respirator. Based on the review of the questionnaire, the Occupational Health Program may deem that a medical exam by a licensed health professional is necessary to determine the ability of the employee or affiliate to wear a respirator. The Occupational Health Program may require a medical release from a medical doctor stating the employee's ability to wear respiratory equipment. Only those individuals who are medically able to wear respiratory equipment shall be issued equipment.

FIT TESTING PROCEDURES FOR RESPIRATORY PROTECTION EQUIPMENT

A fit test determines the quality of the seal between the respirator and the respirator wearer's face. A fit test may entail the use of a quantitative or qualitative protocol to evaluate the fit of a respirator on an individual. At UCD, the proper fitting of the respiratory equipment to the user shall be conducted by the use of one of two methods.

Quantitative Fit Testing

The quantitative fit testing method assesses the adequacy of respirator fit by measuring the amount of leakage into the respirator. UCD is capable of performing this method with the use of the TSI Porta-Count Pro+.

Quantitative fit testing will be performed for: individuals donning SCBAs; wearers of full or half-face APRs; initial fit tests for filtering facepiece respirators (such as N95); or if an individual fails a qualitative fit test for a filtering facepiece respirator to which the individual had previously passed.

1. Before an individual may be fit tested they must complete the required training.
2. Individuals being fit tested are prohibited from any tobacco use (smoke or smokeless) at least 30 minutes prior to the fit test.
3. Individuals will be fitted to the particular make, model, and size respirator used by the department or laboratory where the individual works. Therefore, the individual is required to bring those N95 respirators in different sizes to ensure EHS is able to fit them properly.



4. If the department or individual has not yet been assigned a respirator, EHS has some models of negative pressure APRs in their inventory which can be used for fit testing, and subsequently informing the department and/or individual the type of mask that should be purchased.
5. If an individual wears glasses for their tasks, they must bring them to the fit test.
6. Individuals with facial hair must be clean shaven the day of the fit test, and whenever wearing a respirator, with no hair that interferes with the sealing area of the respirator.

Qualitative Fit Testing

The qualitative fit test is a pass/fail test to assess the adequacy of a respirator. This method relies on the individual's response to the test agent; EHS may use bitrex or saccharin for qualitative fit testing procedures. A qualitative fit test will only be performed for annual recertification fit testing of filtering facepiece respirators (e.g., N95s).

1. Before an individual may be fit tested they must complete the required training.
2. Since the solution that will be used for the qualitative fit testing method is detected through taste, individuals being fit tested should not eat, chew gum, drink flavored beverages, or have anything that would obscure the ability to taste for at least one half hour prior to the test. You may, and it is suggested, drink water prior to the session to help cleanse the palate.
3. Individuals will be fitted to the particular make, model, and size used by the department or laboratory where the individual works. Therefore, the individual is required to have those N95 respirators in different sizes to ensure EHS is able to fit them properly.
4. If the department or individual has not yet been assigned a respirator, EHS has some models of filtering facepiece respirators in their inventory which can be used for fit testing, and subsequently informing the department and/or individual the type of mask that should be purchased.
5. If an individual wears glasses for their tasks, they must bring them to the session.
6. Individuals with facial hair must be clean shaven the day of the fit test, and whenever wearing a respirator, with no hair that interferes with the sealing area of the respirator.

Record Keeping

Once the individual requiring the respirator fit test has passed the fit test the results will be recorded either on the Porta-count report format or on the Qualitative Fit Test Evaluation Form. These forms, along with either the Initial or Annual Respiratory Protection Clearance forms will be scanned and saved to the EHS server. These records will also be tracked using EHS Assistant software. The Initial Respirator Clearance Form and Respirator Medical Evaluation Questionnaire will be kept by the UCD Occupational Health Program.

RESPIRATORY PROTECTION EQUIPMENT MAINTENANCE

Respiratory equipment maintenance and storage shall be carried out in accordance with the instructions of the equipment manufacturer. Those instructions are generally as follows:

Cleaning and Disinfecting

Respirator must be cleaned per Appendix B-2 (included here as Appendix 2) of the Respiratory Protection Standard after each use by cleaning the mask surface with a respiratory wipe; however, after potentially infectious exposures, filtering facepiece respirators cannot be re-used and as such should not be cleaned and disinfected, but rather, they should be discarded. Additionally, in potentially infectious exposures, there are specific protocols for disinfection for air purifying respirators (e.g., half face or full face respirators) and PAPRs; specifically, some infectious exposures may require particular disinfectant cleaning solutions which differ from standard disinfectant wipes (e.g., alcohol or bleach-based wipes). In addition to the procedure from OSHA, the respirator manufacturer should provide guidance on appropriate cleaning methods.

Maintenance

The respirator must be kept in good condition to function properly. To ensure that the respirator condition is in good order, the respirator is to be maintained in accordance the OSHA standard. Each part of the respirator should be examined for defects before each use and at least monthly for respirators used for emergency response. Some defects include:



1. Rubber face piece that is cracked, torn, decomposed, stiffened or distorted.
2. Plastic cartridge/filter holder that is cracked, distorted or badly worn.
3. Rubber cartridge/filter gaskets that is cracked, torn, decomposed or brittle.
4. Rubber inhalation valve that is cracked, torn, distorted, stiffened, or decomposed.
5. Elastic headband that is permanently stretched, stiffened, decomposed, frayed or torn.
6. Snap fasteners on headbands that are loose, distorted or broken.
7. Plastic exhalation valve seat that is distorted, cracked or loose.
8. Rubber exhalation valve that is cracked, torn, stiffened, decomposed or distorted.

If an observed defect cannot be eliminated by replacing defective parts, it may be necessary to purchase a new respirator.

Storage

Respirators must be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals. They must also be packed or stored to prevent deformation of the facepiece and exhalation valve.

Do not hang respirators by their straps for long periods as facepieces and straps will become distorted and the straps will lose their elasticity. Check for these problems before each use.

If plastic bags are used for storage after use, respirators must be allowed to dry before they are placed in a bag. Storing the respirator in a plastic sealable bag after use can present problems. The respirator may be damp after use and sealing prevents drying and encourages microbial growth.

Disposable respirators such as filtering facepieces (e.g., N95, N100, P100) should be disposed after each work shift or when they become damaged or distorted. Store unused disposables in a manner that prevents them from being crushed, misshapen, torn, or exposed to moisture.

End of Service Life Schedules

Respirators with reusable filter cartridges have a useful service life. The service life is the length of time that it provides adequate protection from harmful chemicals in the air. The service life of a cartridge depends upon many factors, including environmental conditions, breathing rate, cartridge filtering capacity, and the concentration of contaminants in the air. EHS will work with individuals on a case-by-case basis to determine the appropriate end of service and change out schedule for their respirator and work environment.

HEPA

Respirators and filter cartridges used **solely** for filtering particulates by HEPA filtration may be used until they are damaged or when the filter media becomes difficult to breathe through due to particulate loading. This includes respirators such as N95s, PAPRs, or half and full-face respirators equipped with HEPA cartridges. The manufacturer recommendation should be consulted, but the following is the OSHA rule of thumb:

- Respirators with replaceable filters are reusable, and a respirator classified as disposable may be reused by the same worker as long as it functions properly.
- All filters must be replaced whenever they are damaged, soiled, or causing noticeably increased breathing resistance (e.g., causing discomfort to the wearer).

Before each use, the outside of the filter material should be inspected. If the filter material is physically damaged or soiled, the filter should be changed (in the case of respirators with replaceable filters) or the respirator discarded (in the case of disposable respirators). Always follow the respirator filter manufacturer's service-time-limit recommendations.

Chemical Cartridges

Change out schedules must be established for all chemical respirator cartridges not equipped with an end-of-service-life indicator (ESLI). Those with an ESLI will be changed when the indicator on the cartridge changes to display that it is no longer protective per the individual manufacturer criteria and instructions.



Some chemical contaminants have specific change out requirements within the OSHA regulation. For those, the criteria established within the regulation must be followed unless specific testing is conducted by EHS or their designee to demonstrate an alternative timeframe is protective.

Cartridges and filtering facepiece disposable respirators must be properly disposed if they are suspected of contamination at regulatory limits. Consult EHS to determine if this media must be managed as a hazardous or regulated waste; in most cases, this is not required. In any case where the respirator was used in a regulated contaminant abatement containment, such as an asbestos abatement containment, the media must be handled as contaminated and must either be decontaminated prior to removal from containment or managed as regulated waste.

OSHA has developed stand-alone standards for some chemicals, such as lead, ethylene oxide, and formaldehyde. These standards spell out specific requirements for these chemicals, including requirements with respect to respiratory protection. Because there are many areas within the university where formaldehyde is used, it is important to note that the OSHA standard for formaldehyde (29 CFR 1910.1048) requires that formaldehyde cartridges be replaced at the end of their service life, or at the end of each work shift, whichever comes first.

Contact EHS for more information on cartridge change schedules, including change out for formaldehyde exposures, or respirator selection.

TRAINING

The purpose of training is to inform employees and affiliates assigned a respirator by UCD the importance and limitations of respiratory protection and educate them on the different types of respirators and how to properly maintain and use them. The training will include:

- Types of respiratory hazards;
- Classes of respirators and their limitations;
- General rules for respiratory protection;
- Positive and Negative pressure fit checks;
- Fit testing of respirators; and
- Cleaning, maintaining, and storage of respirators.

Once training has been completed the individual receiving the training will be assessed of their knowledge acquired from the training through a physical demonstration of the use of the respirator.

For individuals required to wear a negative pressure filtering facepiece respirators (such as N95s) an online training course is offered. This training can be accessed by following the instructions below:

- Logon to the UCD Access Portal
 - o Some individuals may need to select the "CU Resources" tab, if applicable
- Click on the **Training** tab in the middle of the top toolbar
- Click **Start SkillSoft**
- Click **Catalog**
- Click **CU Courses** to view the expandable folder structure
- Click the folder topic – **CU Denver/Anschutz Medical Campus**
- Click the folder topic – **Environmental Health and Safety**
- Select the course **CU: N95 Respirator Safety**
- Click the course title or **[Launch]**

For individuals required to wear a negative pressure air purifying respirator or SCBA, an online training course is offered. This training can be accessed by following the instructions below:

- Logon to the UCD Access Portal
 - o Some individuals may need to select the "CU Resources" tab, if applicable
- Click on the **Training** tab in the middle of the top toolbar



- Click **Start SkillSoft**
- Click **Catalog**
- Click **CU Courses** to view the expandable folder structure
- Click the folder topic – **CU Denver/Anschutz Medical Campus**
- Click the folder topic – **Environmental Health and Safety**
- Select the course **Respiratory Protection**
- Click the course title or **[Launch]**

Once training is completed, EHS will receive an automatic notification from SkillSoft; after that notification is received, EHS will update the individual's training record. Per the earlier section on medical clearance, in addition to completing the training, individuals will also need to complete the appropriate Occupational Health Program forms before a fit test is scheduled. The online training materials can be accessed any time throughout the year (e.g., if an individual needs a refresher mid-year before donning a respirator); additionally, if users cannot access training online, hard copies can be obtained.

For individuals required to wear a PAPR, in-person training will be offered. Training shall occur annually, or any time there are changes in the nature of the exposure or type of PAPR worn.

PROGRAM EVALUATION

The Program Administrator shall conduct evaluations of the workplace to ensure that the RPP is being properly implemented and continues to be effective. Additionally, the Program Administrator must consult employees to ensure that they are using respirators properly; the employees shall be consulted on: their views on program effectiveness to identify any problems, respirator fit, respirator selection, proper respirator use, and respirator maintenance. Any problems that are identified during the evaluation shall be corrected.

COST ASSOCIATED RESPIRATORY PROTECTION PROGRAM SERVICES

EHS has established the following costs for respiratory protection program services; these costs may be waived or charged to the individual UCD Department depending on the nature of respirator use.

1. Review of the EHS Respirator Medical Evaluation Questionnaire by the Occupational Health Program: **\$50.00**
2. Medical Doctor Health Assessment: **TBD**
3. Quantitative Respirator Fit Testing: **\$50.00**
4. Qualitative Respirator Fit Testing: **\$25.00**

APPENDICES

- Appendix 1: [OSHA Respiratory Protection Standard \(29 CFR 1910.134\)](#)
Appendix 2: [OSHA Appendix B-2](#) (Respirator Cleaning Procedures) to 29 CFR 1910.134
Appendix 3: [OSHA Appendix D](#) (Voluntary Respirator Use) to 29 CFR 1910.134
Appendix 4: [Respirator Medical Evaluation Questionnaire](#)
Appendix 5: [Initial Respirator Clearance Form](#)
Appendix 6: [Annual Respiratory Protection Clearance Form](#)
Appendix 7: [Respiratory Protection Acknowledgement Form](#)
Appendix 8: [Key Differences Among Respirators](#)
Appendix 9: [Employee Respiratory Protection Program Evaluation Form](#)
Appendix 10: [PAPR User Fact Sheet](#)