



**AUGUSTA**  
UNIVERSITY

# Respiratory Protection Program

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## **PART 1:**

### **INTRODUCTION**

Faculty, staff and students at Augusta University (AU) are entitled and expected to work in an environment free of unsafe and unhealthy conditions. This goal, as it pertains to respiratory health, is to prevent adverse health effects from the inhalation of hazardous airborne contaminants. This is best attained through accepted engineering control measures to prevent airborne contamination in the work environment. When effective engineering controls are either insufficient or not feasible, respiratory protection in the form of a respirator shall be used in accordance with the Occupational Safety and Health Administration's (OSHA) Respiratory Protection Standard, 29 CFR 1910.134.

Respirators act as a barrier to prevent contaminants such as dusts, fumes, mists, smoke, gases, vapors, or biological agents from entering the body via the respiratory system. For respirator use to be effective and compliant with the OSHA standard, users must have a medical evaluation, fit testing, and training to know how to use and maintain respirators effectively. The purpose of the written AU Respiratory Protection Program is to provide guidance and define responsibilities for implementing the various parts of the program such as: evaluating respiratory hazards in the workplace, respirator selection, medical evaluation, fit testing, training, and record keeping.

## **PART 2:**

### **RESPONSIBILITIES**

#### **Industrial Hygiene and Safety (IHS) Office**

1. Serve as the program administrator for the AU Respiratory Protection Program and update the written program as necessary to reflect changes to the program or workplace conditions that affect respirator use.
2. Evaluate workplace environments suspected of containing an airborne respiratory hazard to determine if they exist and if respiratory protection is needed. Respirator selection will be based on the results of this evaluation.
3. Select an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed. Also, determine the proper size respirator by measuring employees with a tool used to estimate the size respirator they will likely need.
4. Conduct an audit of the AU Respiratory Protection Program on a biennial basis to evaluate the effectiveness of the program.

#### **Employee Health and Wellness (EH&W)**

1. Perform respirator medical evaluations, fit testing, and training for AU employees who use or will need to use a respirator.
2. Document and keep a record of the medical evaluation, fit testing, and training for each AU employee using a respirator.

3. Provide a copy of Appendix D from the OSHA Respiratory Protection Standard to employees who are voluntarily wearing filtering facepiece respirators. Keep a record of these users.
4. Monthly provide compliance reports to supervisors that their employees are due for their annual respirator medical evaluation (if needed), fit testing, and training with EH&W.

### **Supervisors of Respirator Users**

1. Contact IHS for respiratory hazard evaluation and respirator selection. Ensure employees have proper respirators by consulting with IHS before assigning them to enter a hazardous environment. Ensure employees are wearing required respirators.
2. Send employees each year to EH&W for medical evaluation, fit testing, and training prior to employees using respirators for the first time and annually thereafter. The employee must take the respirator(s) they plan to use to EH&W. Note: If the type of respirator is changed, the employee must be sent to EH&W immediately with new respirator for fit testing and training prior to using the respirator.
3. Purchase respirators, replacement parts, cartridges/filters, and replace them as needed. If cartridges do not have an end-of-service-life indicator, a change out schedule must be implemented to ensure they are changed before the end of their service life. Contact IHS for assistance.
4. Notify EH&W if employees are voluntarily wearing respirators. If the respirators are not required, they may or may not need to be in the Respiratory Protection Program, depending on the type respirator used.

### **Employees Wearing Respirators**

1. Complete medical evaluation, fit testing and training prior to using a respirator for the first time and annually thereafter.
2. Report a potentially hazardous environment to their supervisor before entering it to perform work.
3. Visually inspect the respirator before each use and during cleaning. Exchange the respirator if it is damaged. Conduct a user seal check after donning it to ensure it seals to the face. Respirators maintained for use in emergency situations shall be inspected at least monthly and checked for proper function before and after each use.
4. Shave routinely to keep facial hair short. Narrow mustaches may be acceptable, but other facial hair may prevent the respirator from providing a proper seal to the wearer's face. A fit test will not be conducted if there is any hair growth between the skin and the facepiece sealing surface.
5. Clean and properly store the respirator after each use.
6. If breathing becomes difficult and/or chemical odor is detected while wearing the respirator, exit the area. Report this and the need to replace the filter media to your supervisor.

7. Report changes in medical conditions that may require medical re-evaluation or facial structure changes that could affect the fit of the respirator.

### **PART 3:**

## **REQUIREMENTS**

### **Respirator Selection**

Only respirators that are certified by the National Institute for Occupational Safety and Health (NIOSH) will be permitted for use.

NIOSH-certified respirators shall be selected for use when the following conditions apply:

- IHS has identified and evaluated respiratory hazards and determined the need for respiratory protection based on quantitative exposure assessments or a reasonable estimate of the employee's exposure to respiratory hazards given the contaminant's chemical state and physical form.
- The Safety Data Sheet (SDS) or chemical label specifically requires the use of a respirator.
- Areas where infectious biological contaminants may become aerosolized and/or the Biological Safety Officer has deemed respiratory protection necessary.
- Respiratory protection has been deemed necessary when working with laboratory animals to prevent developing allergies.

### Immediately Dangerous to Life or Health (IDLH) Atmospheres

If the oxygen level in an environment is 19.5% or lower, the environment is considered oxygen deficient and IDLH. In situations where exposures cannot be identified or reasonably estimated, the work area shall be considered IDLH. Entry into IDLH environments by AU employees is forbidden. These atmospheres require the use of a self-contained breathing apparatus (SCBA) or air-supplied respirator along with specialized user training.

### Contaminated Environments

A contaminated environment is one in which the concentration of a particulate, fume, mist, gas, or vapor is at or above the OSHA permissible exposure limit (PEL). IHS can conduct assessments of contaminated environments and provide information on proper respirators needed to protect employees working in the area.

### Cartridges for Respirators

A cartridge is a container with a filter, sorbent, or catalyst, which removes specific contaminants from the air that is passed through the container. The type of air contaminant

dictates the type of cartridge used with the respirator. Some types of cartridges are: acid gas, organic vapor, ammonia gas, acid gas and organic vapor combination, and high efficiency particulate air (HEPA) filters. The cartridges are labeled and color coded with the NIOSH approval label. These labels must not be removed and must remain legible.

Respirators equipped with cartridges are not for use where:

- There is an unknown atmosphere or contaminant
- Atmosphere contains less than 19.5% oxygen
- Contaminants have poor odor warning properties

### Filtering Facepieces

The table below provides a list of NIOSH-approved particulate filtering facepiece respirators. This type of air-purifying respirator protects by filtering particles out of the air the user is breathing. There are seven classes of filters for NIOSH-approved filtering facepiece respirators. Ninety-five percent is the minimal level of filtration approved by NIOSH. The N, R and P designations refer to the filter's oil resistance, which is described in the table below.

<b>Class</b>	<b>Description</b>
N95	Filters at least 95% of airborne particles. Not resistant to oil.
N99	Filters at least 99% of airborne particles. Not resistant to oil.
N100	Filters at least 99.97% of airborne particles. Not resistant to oil.
R95	Filters at least 95% of airborne particles. Somewhat resistant to oil.
P95	Filters at least 95% of airborne particles. Strongly resistant to oil.
P99	Filters at least 99% of airborne particles. Strongly resistant to oil.
P100	Filters at least 99.97% of airborne particles. Strongly resistant to oil.

Filtering facepiece respirators are not for use when:

- Atmosphere or contaminant is unknown
- Atmosphere contains less than 19.5% oxygen
- Respirator is not designed for the contaminant present

### Other Factors

When a contaminant is known, other important considerations include:

- Odor threshold/odor warning potential
- OSHA permissible exposure limit and non-regulatory exposure limits
- IDLH level of the contaminant
- Possibility of eye irritation from the contaminant
- Service life of appropriate filter media
- Job tasks (physical exertion) to be performed while wearing respirator

### **Voluntary Use of Respirators**

Tight Fitting Respirators (half face or full face): Any employee that uses this type of respirator must comply with all aspects of AU's Respiratory Protection Program (medical evaluation, fit testing, and training).

Filtering Facepieces (disposable respirators): If a determination has been made that no respiratory hazard exists but the employee wants to wear a filtering facepiece respirator, the employee does not need to have a medical evaluation, fit testing, or training. However, it is mandatory that the employee be provided with a copy of Appendix D from the OSHA Respiratory Protection Standard, which covers information for employees using respirators when not required under this standard. IHS can provide employees with a copy of Appendix D after a determination is made that no hazard exists and use of a filtering facepiece is voluntary.

## **Medical Evaluation**

The medical evaluation is an OSHA required part of the respiratory protection program, which is administered by EH&W. Before an employee is fit tested or required to use a respirator, the employee must have a medical evaluation to determine if the employee is physically able to wear one. The medical evaluation consists of an employee completing a mandatory OSHA Respirator Medical Evaluation Questionnaire (from 29 CFR 1910.134 Appendix C), which is provided to the employee by EH&W. A Licensed Health Care Professional (LHCP) or physician will review the medical evaluation questionnaire and may talk to the employee to determine if further medical examination is needed and if an employee is physically able to wear a respirator safely.

Once medical clearance is given for the employee, he or she is fit tested in the respirator and trained in its proper use by EH&W staff. Employees who are not given medical clearance will not be allowed to perform work requiring respirator use. The OSHA Respirator Medical Evaluation Questionnaire is only required to be filled out once. Each year thereafter the employee is asked to review it and advise if there are any changes to work situation or health.

The following would necessitate an additional medical evaluation (complete the questionnaire and the LHCP or physician determines if further examination is needed):

- An employee reports medical signs or symptoms that are related to ability to use a respirator.
- A physician, LHCP, supervisor, or the respirator program administrator deems it necessary that an employee needs to be reevaluated.
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation.
- A change occurs in workplace conditions that may result in a substantial increase in the physiological burden placed on an employee.

## **Fit Testing**

Fit testing is required annually and is done by EH&W. Employees must bring their respirator(s) and cartridges with them to EH&W for their fit testing. Due to the variations in face size and shape, no single respirator will fit everyone. The fit testing procedure will determine whether the respirator provides an adequate seal between the user's face and the respirator facepiece. If

the employee cannot pass the fit test, another size or type of respirator would need to be obtained for a retest.

Fit testing performed by EH&W is qualitative. This procedure is accepted for environments having airborne contaminant levels not greater than 10 times the OSHA permissible exposure limit (PEL) for air contaminants. Qualitative fit testing involves donning the respirator and placing one's head under a hood while a known test substance is introduced into the chamber. The fit test procedure then requires various head and body movements. Each step of the procedure listed below lasts one minute, except step five.

The following steps of the fit test are done by the employee, while they are standing:

1. Normal breathing.
2. Breathing deeply and slowly, being sure the breaths are regular.
3. Head turned all the way from one side to the other, inhaling at either side.
4. Head moving up and down, inhaling when head is in the full up position (looking toward ceiling).
5. Reading of the "Rainbow Passage" (see below). Its reading forces a wide range of facial movements.
6. Bending over at the waist as if he/she were to touch his/her toes.
7. Normal breathing.

### The Rainbow Passage

*When sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.*

### Facial changes

If a respirator user has had a significant change in body weight, facial scarring, dental changes or any other condition that could affect respirator fit, another fit test should be performed to assure continued use of the respirator will protect the user.

### **Training Information**

Training is required annually and is done by EH&W. It will consist of a discussion with the employee that includes:

1. Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
2. What the limitations and capabilities of the respirator are.
3. If applicable, how to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
4. How to inspect, put on and remove, use, and check the seals of the respirator.
5. What the procedures are for maintenance and storage of the respirator.

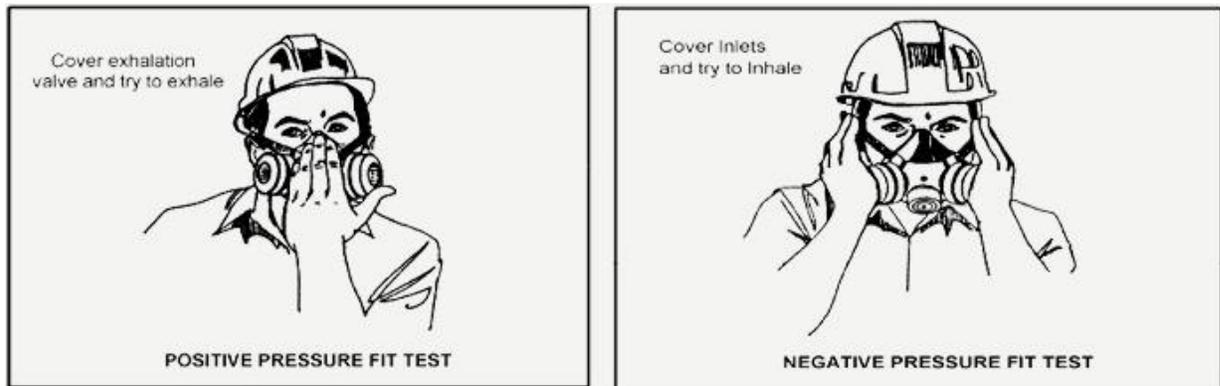
6. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.

Retraining may be required more than annually if any of the following apply:

- Changes in the workplace or the type of respirator render previous training obsolete.
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill.
- Any other situation arises in which retraining appears necessary to ensure safe respirator use.

## User Seal Check

Individuals who use tight-fitting respirators shall conduct a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. This is accomplished by performing a positive and negative pressure check. To perform a positive pressure check, close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. To perform a negative pressure check, close off the inlet opening of the cartridge(s) by covering them with the palm of the hand(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory. An example of each pressure fit test can be seen below.



If air escapes during either check, readjust the facepiece and straps and try again. If an adequate seal is not obtained, discontinue use of the respirator and contact IHS for selection of a different size/type.

## Maintenance and Care of Respirators

Routine attention to respirator upkeep is an important component of the Respiratory Protection Program. By properly cleaning, maintaining, and storing a respirator, its effectiveness is enhanced and life span increased. Filtering facepieces (disposable respirator) are not to be cleaned. If the filtering facepiece becomes difficult to breathe through or is only intended for one-time use, it should be disposed of and replaced.

## Cleaning

Reusable respirators should be cleaned as often as necessary to be maintained in a sanitary condition to remove perspiration, saliva, bacteria and dirt. OSHA's cleaning procedure for reusable respirators consists of the following:

1. Remove filters, cartridges, or canisters and any components recommended by the manufacturer. Discard or repair any defective parts.
2. Wash components in warm water with a mild soap/detergent. Do not use any organic solvents as cleaning agents. A soft brush may be used to facilitate the removal of dirt.
3. Rinse components thoroughly in clean, warm, preferably running water. Drain.
4. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in a hypochlorite solution. Make this solution by adding one milliliter of laundry bleach to one liter of water.
5. Rinse components thoroughly in clean, warm, preferably running water. Drain. It is very important to thoroughly rinse the components. Detergents or disinfectants that dry on facepieces may result in dermatitis. Also, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
6. Components should be hand-dried with a clean lint-free cloth or air-dried.
7. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.
8. Test the respirator to ensure that all components work properly.

Note: The manufacturers' instructions for cleaning a respirator may be used in place of the OSHA cleaning procedure.

## Storage

All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals. They shall be stored to prevent deformation of the facepiece and exhalation valve. It is recommended that after use and cleaning, the respirator be placed in a sealed plastic bag upon completion of the visual inspection. The bag should then be placed in a locker or sturdy container offering protection.

## Inspection

All respirators used in routine situations shall be inspected before each use and during cleaning. All respirators maintained for use in emergency situations shall be inspected at least monthly and checked for proper function before and after each use. Inspection of respirators shall include the following:

1. A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, cartridges, canisters, and filters.
2. A check of elastomeric parts for pliability and signs of deterioration.

Inspection of filtering facepiece respirators shall be performed and include:

1. A check of the strap elasticity.
2. A check of the filter loading or damage.

Respirator deficiencies can compromise protection. Replace defective parts or replace the respirator.

### Respirators Maintained for Emergency Use

These respirators must be certified by documenting monthly inspections. The inspection record must include the inspection date, the name of the person inspecting, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator. This information must be kept with the respirator until it is replaced with the subsequent certification.

### **Cartridge Change Schedule**

Respirator cartridges have a finite service life. The service life of a cartridge depends upon many factors including: environmental conditions, breathing rate, cartridge filtering capacity, and the amount of contaminants in the air. Some cartridges have an end-of-service-life indicator (ESLI) to show when the cartridge needs to be replaced. If the cartridge does not have an ESLI, it should be dated when put into use and changed based on the manufacturer's recommendations. If the manufacturer has made no recommendations, contact IHS for further assistance in determining a change schedule.

### **Program Evaluation**

The AU Respiratory Protection Program will be updated as necessary to reflect changes to the program or workplace conditions that affect respirator use. In addition, evaluations of the workplace will be conducted to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective. Factors to be assessed include, but are not limited to:

1. Respirator fit (including the ability to use the respirator without interfering with effective workplace performance).
2. Appropriate respirator selection for the hazards to which the employee is exposed.
3. Proper respirator use under the workplace conditions the employee encounters.
4. Proper respirator maintenance.

**Table Matrix of Respiratory Protection Program Requirements & Examples of Respirators**

Requirements	Respirator Type			
	PAPR With Loose Fitting Hood	Half Face Or Full Face Respirator	Filtering Facepiece Respirator (Mandatory)	Filtering Facepiece Respirator (Voluntary )
Medical Evaluation	✓	✓	✓	
Annual Training	✓	✓	✓	
Annual Fit Testing		✓	✓	
Appendix D Provided				✓
Assigned Protection Factor (APF)	25/1000*	10/50**	10	10

\* APF based on evidence from manufacturer’s testing

\*\* APF based on qualitative/quantitative fit testing

**Powered Air Purifying Respirators**



**Full & Half Face Respirators**



**Filtering Facepiece Respirators**

