

# Syracuse University

## Respirator Protection Program

---

April 2021

Prepared by:

Syracuse University

Environmental Health & Safety Services

Division of Campus Safety and Emergency Services

029 Lyman Hall

Syracuse, NY 13244



## Table of Contents

|        |  |    |
|--------|--|----|
| 1.     | Introduction .....   | 1  |
| 2.     | Applicability .....  | 1  |
| 3.     | Respiratory Hazards.....   | 1  |
| 4.     | Roles and Responsibilities .....   | 1  |
| 4.1.   | Environmental Health and Safety Services and the RPP Program Administrator ..... | 2  |
| 4.2.   | Directors and Department Heads .....   | 2  |
| 4.3.   | Supervisors, Managers, and Principal Investigators .....                         | 2  |
| 4.4.   | Employees Required to Use a Respirator .....                                     | 3  |
| 4.5.   | Employees Approved to Voluntarily Use a Respirator .....                         | 3  |
| 4.6.   | Facilities Services Safety Manager (FSSM) .....                                  | 3  |
| 5.     | Respiratory Hazard Evaluation .....  | 4  |
| 5.1.   | Respiratory Hazard Evaluation .....  | 4  |
| 5.2.   | Air Monitoring .....   | 4  |
| 5.2.1. | Substance Specific Air Monitoring.....   | 4  |
| 5.2.2. | Non-Substance Specific Air Monitoring.....                                       | 4  |
| 5.2.3. | Air Monitoring Employee Notification.....  | 5  |
| 5.3.   | Respiratory Hazard Mitigation Options .....                                      | 5  |
| 6.     | Respirator Selection Process .....   | 5  |
| 6.1.   | Prohibited Use of Respirators .....  | 5  |
| 6.2.   | Respirator Selection.....  | 5  |
| 6.2.1. | Air-Purifying Respirator (APR) .....   | 6  |
| 6.2.2. | Atmosphere-Supplying.....  | 6  |
| 6.3.   | Respirator Filter & Cartridge Selection .....                                    | 6  |
| 6.3.1. | Particulate Filters.....   | 7  |
| 6.3.2. | N95 Disposable APRs.....   | 7  |
| 6.3.3. | Gas and Vapor Cartridges.....  | 7  |
| 6.3.4. | Filter and Cartridge Disposal.....   | 7  |
| 7.     | Medical Evaluation Procedures .....  | 7  |
| 8.     | Respiratory Protection Program Training.....                                     | 8  |
| 9.     | Fit Testing.....   | 9  |
| 9.1.   | Qualitative Fit Testing Procedure .....  | 9  |
| 9.1.1. | Limitations on Qualitative Fit Testing.....                                      | 10 |
| 10.    | Respirator Issuance Procedure .....  | 10 |

---

|       |  |    |
|-------|--|----|
| 11.   | Respirator Use Procedures .....                  | 10 |
| 11.1. | Preventing Facepiece Seal Leaks .....            | 10 |
| 11.2. | User Seal Check.....                             | 11 |
| 11.3. | Continuing Respirator Effectiveness .....        | 11 |
| 12.   | Respirator Maintenance and Care Procedures ..... | 12 |
| 12.1. | Cleaning and Disinfecting .....                  | 12 |
| 12.2. | Storage.....                                     | 12 |
| 12.3. | Inspection and Maintenance.....                  | 13 |
| 12.4. | Repair .....                                     | 14 |
| 12.5. | Breathing Air Quality .....                      | 14 |
| 13.   | Voluntary Respirator Use Procedure .....         | 14 |
| 14.   | Program Records.....                             | 15 |
| 14.1. | Medical Evaluation Records.....                  | 15 |
| 14.2. | Respirator Fit Test Records .....                | 15 |
| 14.3. | Employee Exposure Monitoring Records.....        | 16 |
| 14.4. | Objective Data Records .....                     | 16 |
| 14.5. | Respirator Protection Program.....               | 16 |
| 15.   | Program Evaluation.....                          | 16 |

**List of Appendices:**

**Appendix A: Definition of Terms**

**Appendix B Syracuse University’s Respirator Assignment Table**

**Appendix C Syracuse University Respiratory Protection Program Review and Evaluation Form**

## 1. Introduction

Syracuse University's Respirator Protection Program (RPP) strives to protect University employees from exposure to respiratory hazards in the workplace. The RPP is administered by the University's Environmental Health and Safety Services (EHSS) department, located in 029 Lyman Hall.

This RPP Manual summarizes the procedures and requirements established by the University's RPP in accordance with the requirements of the Occupational Safety and Health Administration (OSHA) Respiratory Protection Standard, 29 CFR 1910.134 (OSHA Standard). EHSS maintains the RPP Manual on their website and updates it periodically to reflect changes in regulation or the RPP.

## 2. Applicability

Syracuse University's RPP applies to all Syracuse University employees who are engaged in activities that require the use of respirators as determined by the University or OSHA. Portions of the RPP are also applicable to employees who voluntarily use a respirator while engaged in activities at Syracuse University where respirator protection is not required (Section 1.3). The University's RPP does not apply to non-University employees (e.g. contractors) performing activities at the University that may require respirators use.

## 3. Respiratory Hazards

A work area's atmosphere is hazardous if it does not contain sufficient oxygen, or if it contains chemical, biological, or radiological contaminants in sufficient quantity to harm the health of employees. The OSHA Standard requires employers to take action to protect employees who are exposed to harmful respiratory hazards. This includes taking action to control respiratory hazards in the form of airborne particles, vapors or gases at levels that exceed acceptable limits established by OSHA, referred to as Permissible Exposure Limits (PELs). These protective actions, or exposure controls, include engineering and administrative controls:

- Local exhaust or general dilution ventilation
- Isolation or enclosure of the work process
- Substitution of less hazardous substances
- Rescheduling or limiting time spent in a hazardous environment.

Engineering and administrative exposure controls are the preferred methods for reducing worker exposure. EHSS assists departments in identifying and implementing engineering and/or administrative exposure controls when they are determined to be necessary and feasible.

However, when such exposure controls are:

- not feasible, or
- not able to completely control the respiratory hazard, or
- under repair/being instituted, or
- during emergency situations,

respirators are assigned. A respirator is defined as a device to protect the wearer from airborne respiratory hazards.

## 4. Roles and Responsibilities

The roles and responsibilities of the University's RPP are outlined in this Section.

#### **4.1. Environmental Health and Safety Services and the RPP Program Administrator**

EHSS has the role of administrating and maintaining the RPP. EHSS' Occupational Health Manager serves as the University's RPP Program Administer (PA). The PA, supported by other EHSS personnel, provides managers, supervisors, and employees with assistance in implementing RPP. EHSS's and the PA's responsibilities in support of the RPP include:

- Conduct workplace respiratory hazard evaluations for activities identified to EHSS that may present respiratory hazards and recommend exposure controls, including respirators when necessary.
- Coordinate the notification of respiratory exposure air monitoring results to affected employees within 15 business days of receipt or sooner if required by a specific standard.
- Coordinate/assist with identifying and tracking employees using respiratory protection at Syracuse University.
- Select appropriate respirators and filters or cartridges, when they are determined to be necessary, based on hazards to which workers are exposed, and in accordance with OSHA standards.
- Provide respiratory protection training and respirator fit testing to employees who are required to use a respirator.
- Coordinate with a licensed occupational medical provider to provide employees required to use a respirator with medical surveillance necessary for respirator use.
- Maintain RPP related records including respiratory hazards evaluations, training, fit testing, respirator assignments and non-confidential medical evaluation records.
- Conduct periodic program evaluations and a review of this RPP Manual with sufficient frequency to verify the elements of RPP are effectively being implemented and the RPP Manual accurate reflects current requirements of the OSHA Standard and the University's RPP.
- Consult with managers, supervisors and respirator users on issues related to the RPP.

#### **4.2. Directors and Department Heads**

Directors and department heads are responsible for the safety of all their employees. They fulfill this responsibility, in part, by ensuring that their managers, supervisors and employees take seriously their roles in implementing the RPP and overseeing and assisting with the compliance of all requirements, procedures and practices outlined in this RPP Manual.

#### **4.3. Supervisors, Managers, and Principal Investigators**

Supervisors, managers, and principal investigators have direct responsibility for the health and safety of their employees required to use respiratory protection. Their duties in implementing the RPP in their areas include:

- Identify locations and activities which may present a respiratory hazard or concern and request a respiratory hazard evaluation from EHSS.
- Request assistance from EHSS in evaluating new operations that may introduce a respiratory hazard or concern\*.
- Implement and maintain feasible exposure controls, including engineering and work practice controls, and respiratory protection when necessary, as required based on the results of a respiratory hazard evaluation.
- Observe work areas and report any changes in existing operations or in the workplace conditions (workload, protective clothing or temperature) that may result in substantial increase in physiological burden placed on an employee or impact the adequacy of the currently assigned respiratory protection to EHSS\*.
- Be aware of tasks requiring the use of respiratory protection and enforce proper use of respirators by their employees.
- Provide employees with appropriate respirators, where such devices have been assigned by EHSS.
- Identify to EHSS of all employees who are required to perform an activity where respiratory protection is required, as determined by a respiratory hazard evaluation\* .
- Inform EHSS of any employee requesting to use a respirator voluntarily for activities where a respirator is not required (as determined by a respiratory hazard evaluation)\*.

- Schedule employees required to use a respirator for initial medical evaluation before employees are fit tested and issued a respirator, and periodically thereafter as outline in Section 9 of this RPP Manual.
- Ensure employees required to use a respirator receive annual RPP training.
- Make available respirator components and accessories to maintain respirators in good working condition.
- Make sure resources are available for employees to properly clean, maintain and store their respirator.
- Notify EHSS when employees assigned to use a respirator change positions or job responsibilities or terminate employment with the University\*.

*\*Facilities Services supervisors may contact the Facilities Services Safety Officer (FSSO) in lieu of EHSS. The FSSO will then contact EHSS.*

#### **4.4. Employees Required to Use a Respirator**

Employees performing activities where use of a respirator is required are responsible for supporting the implementation and adhering to the procedures and requirements of the RPP. Their duties include:

- Assist the supervisor, manager, principal investigator and EHSS in identifying activities that may present a respiratory hazard or concern.
- Complete RPP training and fit testing as instructed.
- Participate in required medical evaluations.
- Wear respiratory protection provided in accordance with instruction and training provided by EHSS and/or the FSSO.
- When required to use a tight-fitting respirator, remove facial hair to ensure a proper seal between the face and respirator.
- Use only the respirator for which they have been trained and fitted.
- Use the respirator only for the tasks that it was issued for.
- Inspect respirator for defects or expired filters or cartridges prior to each use and conduct user seal checks every time the respirator is worn.
- Clean and disinfect non-disposable respirator and store properly in a sanitary location as trained.
- Notify their supervisor or EHSS of any problems associated with using a respirator. This includes any difficulty breathing/dizziness or anxiety, fit, and concerns the respirator is not providing adequate protection.\*
- Report any physiological changes (e.g. facial scarring, dental changes, cosmetic surgery or change in body weight) or any medical changes that could affect the respirator fit or ability to safely wear a respirator to their supervisor or EHSS\*.
- Notify their supervisor or EHSS if prescription glasses inserts are required for use with a full-face respirator\*.

*\*Facilities Services employees may contact the Facilities Services Safety Manager (FSSM) in lieu of EHSS. The FSSM will then contact EHSS.*

#### **4.5. Employees Approved to Voluntarily Use a Respirator**

Employees who request and are approved by EHSS to voluntarily use a respirator while conducting activities where respiratory protection is not required (as determined by a respiratory hazard evaluation) as responsible for adhering to the voluntary respirator use requirements and procedures outlined in Section 13 of this RPP Manual.

#### **4.6. Facilities Services Safety Manager (FSSM)**

Facilities Services Safety Manager (FSSM) collaborates with EHSS to oversee and manage the implementation of the RPP for Facilities Services employees and their work areas, including:

- Provides guidance and consultation on respirator use and care for Facilities Services employees.
- Identifies locations and operations to EHSS that may present a respiratory hazard or concern warranting further evaluation.
- Assists with enforcing Facilities Services employees' compliance with the requirements of the RPP.

- Assists with the notification of respiratory exposure air monitoring results to affected Facilities Services employees.
- Supports Facilities Services supervisors to make sure respirator components and accessories are available to maintain respirators in good working condition.

## 5. Respiratory Hazard Evaluation

Supervisors and employees are responsible for identifying potential respiratory hazards associated with work activities and requesting a respiratory hazard evaluation from EHSS. A respiratory hazard evaluation is conducted by EHSS as described below to determine if a respiratory hazard is present and, if so, the actions that can be taken to mitigate the hazard.

### 5.1. Respiratory Hazard Evaluation

When performing a respiratory hazard evaluation, EHSS reviews the work area, work activities and/or materials used to determine if a respiratory hazard is present. At a minimum, the following information is taken into account during the evaluation:

- Nature of the hazard (e.g., gas, dust, fume, combination, etc.)
- The physical and chemical properties of the potential air contaminant
- Concentrations of contaminants
- Relevant permissible exposure limit or other occupational exposure limit
- Nature of the work operation or process (e.g., type of activity, equipment used, etc.)
- Length of time the work is performed
- Work activities and physical/psychological stress

In some cases, EHSS may determine that air monitoring is necessary to reasonably estimate if a respiratory hazard is present. Section 5.2 describes the types of air monitoring conducted.

### 5.2. Air Monitoring

When EHSS determines air monitoring is necessary to fully complete the respiratory hazard evaluation, the air monitoring is conducted by EHSS or with the assistance from an occupational health and safety consultant or air monitoring firm. Any air monitoring conducted follows sound industrial hygiene methods to reasonably estimate employee exposures with typical strategies provided below:

#### 5.2.1. Substance Specific Air Monitoring

OSHA has specific monitoring requirements for its substance-specific standards (e.g., benzene or lead) where the employee wears a personal sampling pump and collection media positioned in their breathing zone during their entire work-shift. This is referred to as personal air monitoring and is the most accurate way of obtaining employee exposure information. When substance specific standards are required, personal air monitoring follows the prescribed methodology.

#### 5.2.2. Non-Substance Specific Air Monitoring

If there is no substance-specific air monitoring requirement, exposure estimates are completed by:

- Personal air monitoring (full shift or partial shift): When conducting partial-shift personal air monitoring, monitoring is conducted during peak conditions when exposures are expected to be highest.
- Fixed location air monitoring (full shift or partial shift): When conducting fixed location monitoring, air monitoring is performed in the area near the source of the emissions (e.g. near the activity being evaluated for a respiratory hazard). As employees generally move about during their shift and away from the exposure hazard, fixed location monitoring conservatively over-represents an employee's exposure. If partial-shift air sampling is performed, it is conducted during peak conditions when emissions are expected to be highest.

- Using Objective Data: The use of objective data, such as studies conducted for similar activities, trade association data, manufacturers exposure data, or chemical information from Safety Data Sheets, will be used as long as the exposure conditions (e.g. processes, types of materials, control methods, work practices, and environmental conditions) are similar to those in the University's workplace.

### 5.2.3. Air Monitoring Employee Notification

Results of respiratory exposure air monitoring are provided to affected employees within 15 business days of receipt or sooner if required by an OSHA substance specific standard.

### 5.3. Respiratory Hazard Mitigation Options

If the respiratory hazard evaluation and any air monitoring conducted to support the evaluation determine that a respiratory hazard is present while performing the specific work activity, possible options to mitigate the hazard are then identified and reviewed by EHSS. EHSS first evaluates if engineering or work practice controls can be implemented to mitigate the hazard. If such controls are not feasible, EHSS then selects and assigns appropriate respiratory protection as outlined in Section 6.

## 6. Respirator Selection Process

If a respiratory hazard evaluation concludes a respiratory hazard is present that exceeds occupational exposure limits and the hazard cannot be controlled by engineering or administration controls, respiratory protection is assigned as outlined in this section. Respirator protection assignments are recorded and reflected in Appendix B of the RPP.

### 6.1. Prohibited Use of Respirators

At Syracuse University, respiratory protection will not be assigned, and employees will not be allowed to perform tasks or processes where:

- A respiratory hazard above an occupational exposure level is presumed to exist and the contaminant level is unknown and cannot be measured or reasonably estimated (e.g., emergency spill response).
- The respiratory hazard is determined to exceed levels that are immediately dangerous to life or health (IDLH).
- An oxygen deficient atmosphere exists, and engineering controls and work practices are not able to eliminate the hazard (e.g., confined spaces such as tanks, boilers, vaults, crawl spaces and storm drains).

If the situations above are encountered, the University relies on an outside response agency or vendor capable of providing that level of service.

### 6.2. Respirator Selection

Respirator selection requires correctly matching the respirator with the hazard, the degree of hazard, and the user. The selected respirator selected must be adequate to effectively reduce exposure of the respirator user under all conditions of use while permitting the user to perform the job with the least amount of physical burden. EHSS assists departments in selecting appropriate respirators, filters & cartridges, and related respiratory supplies appropriate to the hazards to which the workers are exposed and in accordance with the OSHA Standard.

The following criteria is used in the respirator selection process:

- Type of hazard (e.g. gas, vapor, particulate, biological, etc.).
- Results of respiratory hazard evaluations.
- Assigned protection factor (APF) of the respirator and Maximum Use Concentration (MUC) calculations.



- User and workplace factors, such as temperature and humidity, ease of communication, ease or difficulty of the work or rate of activity, type of workplace task, length of time respirator will be worn, proximity to source of contamination and the location and movement of other personnel and equipment that may require specific respirator types.
- Fit testing results/unique facial characteristics of the wearer.

All respirators selected for employee use at Syracuse University are certified by NIOSH and used in compliance with the conditions of certification.

### 6.2.1. Air-Purifying Respirator (APR)

APRs are selected when it is necessary to remove particulate, vapor and/or gas contaminants from the air. APRs selected are adequate to protect the health of the employee and ensure compliance with OSHA requirements pertaining to respiratory protection. APRs used at the University include:

- Half Face Filtering Facepiece (Disposable) N95 Respirator
- Half Face (Elastomeric) Respirator
- Full Face (Elastomeric) Respirator
- Full Face Powered Air-Purifying Respirator - used with a tight fitting facepiece or loose fitting hood/helmet.

An appropriate filter or filter cartridge must be selected and used with the APR. The exception is the disposable style N95 APRs in which the entire face piece of the respirator is a filter. Details on respirator filter selection and use duration are provided later in Section 6.3.1.

### 6.2.2. Atmosphere-Supplying

Atmosphere supplying respirators provide breathing air from an uncontaminated source independent of the ambient atmosphere. An example of this type of respiratory is a self-contained breathing apparatus units (SCBA) with a tight fitting, elastomeric facepiece that covers the user's face and the air is supplied from an air cylinder carried by the equipment user.

The use of SCBAs at the University is restricted to EHSS staff only and while performing limited operations such as laboratory cleanouts and responses to controlled, small non-IDLH hazardous material spills. The University does not allow its employees to enter areas or perform operations in known or suspected IDLH or oxygen deficient atmospheres. When/if an IDLH or oxygen deficient atmosphere is encountered or suspected, an outside response agency or vendor capable of providing entrance into an IDHL atmosphere is contacted to provide this service.

## 6.3. Respirator Filter & Cartridge Selection

There are many types of filters and cartridges used on APRs. The type of filter, cartridge or combination selected depends on the characteristics and concentration of airborne contaminants present.

All filters and cartridges used at the University are NIOSH certified and appropriately color coded with the NIOSH approval label.

The label clearly state:

- The class of contaminants for which the filter or cartridge is certified
- The NIOSH certification number, and
- Any limitations or precautions associated with its use.

The label serves several important purposes:

- It identifies what contaminants the filter or cartridge protects the user from.

- It permits the employee using the respirator to check and confirm that the respirator has the appropriated filters or cartridges before their respirator is used, and
- The color-coding scheme allows coworkers, supervisors and EHSS to readily determine that the employee is using the appropriate filter or cartridge.

### 6.3.1. Particulate Filters

Particulate filters are used to protect employees from dusts and fibers, fumes, mists, and biological materials. The three levels of filter efficiency (95, 99 and 99.97), based upon the percent the filter can exclude a particle of 0.3 micrometers in diameter, is factored in during the selection process as is the three levels of oil resistance, N (not oil resistant), R (oil resistant and P (oil proof). N-series filters are not used to protect against oily aerosols.

The service life of particulate filters is limited by considerations of hygiene, damage, and breathing resistance. Particulate filters are not equipped with end of service life indicators (ELSI). Particulate filters are replaced after a maximum 40-hours of use or whenever they are damaged or breathing becomes noticeably restrictive, for hygienic reasons; or as required by a substance specific standard such as lead or asbestos requiring earlier change-outs.

### 6.3.2. N95 Disposable APRs

N95 disposable APRs are low-cost respirators and are typically discarded after a single use. N95 APRs may be reused under certain conditions (e.g. reduced availability), but service life is still limited by considerations of hygiene, damage, and breathing resistance. Under reuse conditions, N95 APRs are replaced after a maximum use of 40-hours, or whenever they are damaged or breathing becomes noticeably restrictive, or for hygienic reasons.

### 6.3.3. Gas and Vapor Cartridges

Gas and vapor cartridges are types of filters used to protect employees from gases and vapors. There are several types of gas and vapor cartridges including those that protect the user from acid gases from laboratory activities and common solvent vapors created during painting activities.

Some gas and vapor cartridges are equipped with an end-of-life service indicator (ELSI) that warns the user that a cartridge is approaching the end of its ability to provide protection. The ELSI indicator changes color when the sorbent material is exhausted and indicates to the user that it is time to change the cartridge. When no ELSI available for the cartridge being used, a cartridge is replaced after a maximum 8-hours of use, as determined by EHSS for a specific process/task, or as determined by a substance-specific standard.

### 6.3.4. Filter and Cartridge Disposal

Following use, most spent filters and cartridges can be discarded in the regular trash. However, filters used while working with asbestos, PCBs, radioactive materials are disposed as regulated waste through EHSS and are not discarded in the regular trash.

## 7. Medical Evaluation Procedures

Employees assigned to perform work activities requiring the use of respirators, as determined by EHSS or an OSHA Standard, are evaluated and confirmed to be medically qualified to wear a respirator prior to being provided a respirator.

The purpose of a medical evaluation is to determine if the respirator user can tolerate the physiological burden associated with respirator use, including the burden imposed by the respirator itself (e.g., its weight and breathing resistance); musculoskeletal and cardiopulmonary stress (e.g., when the respirator to be worn is an SCBA); limitations on hearing, sight, or smell; and isolation from the workplace environment. The medical evaluation considers the following factors:

- type and weight of the respirator to be worn;

- duration and frequency of respirator use;
- expected physical work effort;
- use of protective clothing and equipment to be worn; and
- temperature and humidity extremes that may be encountered.

EHSS coordinates respiratory protection medical evaluation services with a licensed occupational medical provider. The medical evaluation is performed following the requirements found in the OSHA Standard which includes a confidential medical questionnaire. The employee involvement in the evaluation is conducted during their normal working hours or at a time and place convenient to them.

The medical provider completes the medical evaluation and provides a “respirator medical qualification” document to the University. The document indicates if the employee is medically able to use a respirator, if there are any limitations on respirator use related to a medical condition of the employee or relating to the workplace conditions in which the respirator will be used, or if a follow-up medical evaluation is necessary. Medical evaluations are provided periodically for as long as the respirator user is required to wear a respirator and at a frequency determined by the medical provider, or by a OSHA specific standard.

EHSS maintains the medical provider’s written respirator medical qualification document in an employee file.

Additional medical evaluations are provided whenever the following conditions are encountered:

- An employee reports medical signs or symptoms related to the ability to use a respirator.
- EHSS, or a supervisor recommends re-evaluation.
- Observations made by EHSS or a supervisor during fit testing and/or Program evaluation indicates a need for employee re-evaluation; or
- A change occurs in workplace conditions (e.g. physical work effort, type of respirator used, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

The medical evaluation is provided at no cost to the employee. Employees refusing the medical evaluation are not permitted to perform a task requiring respirator use.

## 8. Respiratory Protection Program Training

The OSHA Standard requires employees who are performing work activities requiring them to use a respirator be provided with effective training on the RPP and associated procedures and requirements, to help protect the employees while they use respirators. At the University, EHSS coordinates providing employees, who are required to use a respirator, with initial RPP training prior to the use of a respirator and annual RPP training thereafter. Additional RPP training is also provided whenever:

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

The RPP training provided includes information consistent with the requirement of the OSHA Standard , including at a minimum:

- Why the respirator is necessary and how improper fit, usage and maintenance can make the respirator ineffective.
- The limitations and capabilities of respirators.
- General rules for respiratory protection.
- How to inspect, put on and remove, use, and check the seals of the respirator.
- Cleaning, maintaining, and storage of respirators.

- How to recognize medical signs and symptoms that may limit or prevent effective use of the respirator.
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.

Employees who voluntarily use filtering facepiece respirators (e.g., N95 disposable respirator) are exempt from annual training, but they must follow the Voluntary Respirator Use procedures outlined in Section 13 of this manual.

## 9. Fit Testing

Fit testing is a procedure used to determine how well a respirator forms a seal to the user's face to identify the specific make, model, style, and size of respirator best suited for each user. If a secure facepiece-to-face seal is not achieved, the respirator will provide a lower level of protection than it was designed to provide. At the University, EHSS performs the fit testing for employees using a qualitative fit test. EHSS fit tests all employees assigned to use air-purifying and atmosphere-supplying respirators with tight fitting face pieces. Employees assigned to use loose fitting positive pressure APRs are not fit tested as these types of APRs are exempt from fit testing in the OSHA Standard. Employees voluntarily using a disposable N95 respirator are not required to be fit tested.

An employee is fit tested for each type of respirator they are assigned. Fit testing is performed:

- After the initial respirator medical qualification and before being issued a respirator.
- Whenever an employee switches to a different tight-fitting facepiece respirator of different size, make or model.
- When there are changes in the user's physical condition (e.g. weight, dental work, facial scars, cosmetic surgery).
- At least annually thereafter.

### 9.1. Qualitative Fit Testing Procedure

Qualitative fit testing is an OSHA accepted respirator fit test procedure that uses a test agent to determine the effectiveness of the user's facepiece-to-face seal. EHSS follows the procedures outlined in Appendix A of the OSHA Standard to perform qualitative fit test using an irritant smoke as the test agent.

EHSS's general fit testing procedure includes:

- Providing a sufficient number of respirator sizes and models for an initial user or a user who needs a different respirator to select from to ensure a proper fit.
- Instructing the user on how to put on the respirator by correctly positioning the respirator on the face, adjusting strap tension, and determining if the respirator provides an acceptable fit and appropriate level of comfort will be given to the user.
- Donning of the respirator by the user for at least five minutes before performing the fit test.
- For SCBA Facepieces - Disconnecting the air supply and installing a particulate filter on the user's facepiece to convert the facepiece into a negative pressure APR.
- For powered air purifying respirators - Turning off the blower prior to fit testing.
- Requesting the user being fit tested to perform the following exercises during application of the test agent to "detect" leaks in the facepiece-to-face seal,
  - Normal breathing then deep breathing
  - Talking out loud
  - Moving head up and down, and side to side
  - Bending at the waist
- Selecting a different respirator (size, make, model) and retesting the user if a response to the testing agent is detected by the user.

- Offering opportunity to select a different respirator to fit test on if the employee finds the fit of the respirator unacceptable.
- Having the user perform a positive and negative seal check. If the respirator fails the user seal checks and adjustment does not correct the poor fit, the user is given another respirator and retested.
- Issuing an unsatisfactory fit test when any hair growth (e.g. beard, mustache, sideburns) is between the skin and respirator facepiece and affecting the seal of the facepiece to the users face.
- Ceasing the test and referral to the licensed occupational medical provider for further evaluation when the user exhibits difficulty breathing during the test.

All fit tests are recorded by EHSS on a Respirator Fit Test Record documenting the type, model, and size of respirator for which the employee has been trained and fit tested. EHSS maintains the respirator fit test record as indicated in Section 14 of this RPP Manual.

### 9.1.1. Limitations on Qualitative Fit Testing

Negative pressure APRs that are successfully fit tested using a qualitative fit test are relied upon to reduce an employee's exposure by a protection factor of ten. In practice, this means the APR, including a full-face respirator is used in workplace atmospheres where the level of the hazardous contaminant is 10 times or less than the permissible exposure limit and never above the IDLH value.

## 10. Respirator Issuance Procedure

Once University employees that are required to wear a respirator are medically qualified, trained and successfully fit tested, they are issued (provided) a respirator of the same make, model and size respirator they were fit tested on. The employee's department is responsible for procuring and making available the necessary respiratory protection equipment at no cost to the employee.

Sharing of respirators between employees is not allowed except for SCBA facepieces used by EHSS, but only after proper cleaning procedures are completed.

## 11. Respirator Use Procedures

Proper use of respirators is required at all times. Respirator users must follow proper use instructions provided by EHSS during RPP training, and instruction provided by the manufacturer, the employee's supervisor and/or the FSSO. This includes:

- Wearing the respirator in a manner to prevent leaks in the respirator facepiece seal (e.g. no facial hair).
- Not taking the respirator off when working in a hazardous environment. Employees must first remove themselves from the area before taking off the respirator.
- Avoid changing work conditions that can render respiratory protection inadequate (e.g., increased airborne contaminate concentration).
- Proper donning and doffing of the respirator
- Confirming the respirator operates effectively (e.g. user seal check).
- Using the respirator within the capabilities and limitations of its design

### 11.1. Preventing Facepiece Seal Leaks

Facepiece seals are important in tight-fitting respirator facepieces. Employees are not allowed to wear tight-fitting facepieces if any of the following conditions **interferes** with the seal of the respirator to the employee's face or with the respirators valve function:

- Facial hair.
- Facial deformities (e.g. scars, prominent cheekbones, deep skin creases).

- Jewelry or headgear that projects under the facepiece seal.
- Missing dentures.

If corrective glasses or other personal protective equipment is worn, they will be worn in a manner to not interfere with the facepiece seal or valve function.

### 11.2. User Seal Check

Respirator users are instructed to conduct a user seal check every time they put on (don) a tight-fitting respirator to verify that the respirator is seated properly on the face with no noticeable leaks. The user seal check procedure conducted will be a positive and/or negative pressure check as described in Appendix B-1 of the OSHA Standard or the manufacturer's recommended procedures (when equally protective). If leaks are present, the respirator is adjusted and the user seal check repeated. If the user cannot achieve an adequate seal check, their supervisor or EHSS is contacted for assistance.

Employees are instructed in RPP training to review the manufacturer's instructions that came with their respirator. EHSS also provides basic instructions on user seal checks to the users each time fit testing is performed. The following is the general procedure provided to employees:

#### Performing the Positive Pressure Seal Check

- Place the palm of your hand over the exhalation valve cover (or entire facepiece for a disposable N95\*) and exhale gently.
- The facepiece should bulge slightly.
- If air leaks between your face and the seal of your respirator, reposition it and adjust the straps for a more secure seal and repeat the seal check

\*Note that on N95 disposable respirators, the exhalation valves are not designed for a positive pressure seal check. If you are wearing a valved disposable respirator, only a negative pressure seal check is applicable.

#### Performing the Negative Pressure Seal Check

- Place the palm of your hand over the filter inlets (or entire facepiece for a disposable N95) and inhale gently
- The facepiece should collapse slightly
- If the facepiece does not collapse, reposition it and adjust the straps for a tighter seal and repeat the seal check

If you cannot achieve a proper seal and adjusting the facepiece and straps does not help, do not perform the task requiring respiratory protection and contact your supervisor or EHSS.

### 11.3. Continuing Respirator Effectiveness

The University periodically observes work area conditions where respirators are used to identify changes that may diminish the effectiveness of a respirator. Observations include looking for modifications in the work area such as change in work activities or processes that can result in changes in the hazard, or the time period of exposure. Observations of workplace conditions assists in determining:

- Whether or protective equipment is interfering with respirator use
- Whether employees are experiencing discomfort, such as skin irritation or breakthrough of contaminants through sorbent filters.
- Whether a change in work conditions may result in exposure to new airborne hazards or an increase in airborne hazard concentrations

## 12. Respirator Maintenance and Care Procedures

Respirators are properly maintained in accordance with manufacturer's instructions and per the requirements of the RPP. Primary responsibility for maintaining the respirator rests with the user. Supervisors periodically check to determine if employees are properly maintaining their respirator(s) and assure parts and supplies are available when required.

To ensure respiratory equipment remains serviceable and delivers effective protection, respirator maintenance follows cleaning and disinfecting procedures, proper storage, regular inspections, and repair methods for defects. Worn or deteriorated parts are replaced prior to use or the respirator replaced in its entirety. No components are replaced or repairs made beyond those recommended by the manufacturer. Repairs to regulators or alarms of SCBA respirators are conducted by the manufacturer or an authorized service representative.

### 12.1. Cleaning and Disinfecting

Regular cleaning and disinfection of a respirator is important so that it functions as designed and is necessary to prevent skin irritation and dermatitis. Respirators that are issued for the exclusive use of an employee, are cleaned, **and** disinfected as often as necessary to be maintained in a sanitary condition. Work site conditions (e.g. dusty/dirty) typically dictate cleaning frequency. Respirators used by more than one individual (e.g. SCBA respirators, fit testing, and training respirators) are cleaned and disinfected after each use.

The respirator user is responsible for cleaning and disinfecting their assigned respirator(s) and will use the following procedure.

- First remove any particulate filters or chemical cartridges.
- Disassemble facepieces by removing any diaphragms or valve assemblies.
- Wash the facepiece and associated components in a mild detergent with warm water. A stiff bristle brush (not wire) may be used to facilitate removal of any dirt/debris.
- Rinse completely in clean warm running water.
- Drain the components.
- Wipe the respirator with disinfectant wipes (70% Isopropyl Alcohol) to kill germs.
- Air dry the respirator in a clean area.
- Reassemble facepiece components, replacing filters, cartridges, and canisters where necessary.
- Test the respirator to ensure that all components work properly.
- The respirator is now ready to be used and/or placed into storage.
- Supervisors and/or the FSSO provide an adequate supply of appropriate respirator cleaning materials and respirator parts.
- Disposable style respirators such as the N95 particulate respirator cannot be cleaned and should be discarded following the particulate change out schedule discussed earlier in the RPP.

### 12.2. Storage

Improper storage can also reduce a respirator's protective effectiveness. University employees who are issued respirators store respirators in a manner that:

- Protects the respirator from contamination, dust, sunlight, extreme heat and cold, excessive moisture, chemicals, or other destructive conditions.
- Prevents the facepiece or valves from becoming deformed.
- Follows all storage precautions issued by the respirator manufacturer.

Storage is in a sealable container or plastic bag and with the users name on it. Filter elements are removed and stored separately in a secondary container or plastic bag. Disposable N95 respirators stored for re-used are stored in paper bags with the employee's name on the outside of the bag.

Respirators for emergency use (e.g. SCBA), are not stored in an area that may itself become involved in an emergency and become contaminated or inaccessible.

### 12.3. Inspection and Maintenance

Respirators are inspected on a regular basis to confirm their continued reliability. The frequency of inspection and the procedures to be followed depend on whether the respirator is intended for routine use or emergency use.

Inspection frequency:

- Routine Use - Respirators used in routine situations are inspected before each use and during cleaning by the respirator user.
- Emergency Use (non-ILDH) - SCBA respirators maintained for use in emergency situations are inspected at least monthly and in accordance with the manufacturer's recommendations and are checked for proper function before and after each use.

For routine use APR respirators, inspections include the following items:

- Inspect the respirators straps or harness:
  - Check the webbing for any breaks or tears
  - Look for deterioration of the webbing's elasticity or fraying edges
  - Pull on head harness to ensure all parts remain in place and do not break under tension
- Inspect the facepiece:
  - Ensure that no holes or tears are present
  - Make sure the facepiece edges are not rippled or distorted
  - Look for missing gaskets
  - Check that valves are in place and free of particles or dirt which may cause a poor seal.
  - For disposable N95 respirators, ensure that the metal nose clips form easily over the bridge of the nose
- Inspect the inhalation and exhalation valves
  - Ensure valves and valve seats are in place and free of particles or dirt which could cause a poor seal
  - Inspect for any broken valve covers
- Inspect filters or cartridges:
  - Ensure that the filter/cartridge being is appropriately matched for the facepiece make and model and are NIOSH certified
  - Check the filter/cartridge housing for cracks
  - Ensure that the filter/cartridge threads and facepiece threads are not damaged and have not be crossed threaded
  - Verify the filter/cartridge has not passed it's expiration date or exceeded the recommended use time

For emergency use SCBA respirators, inspection includes all of the above items and also includes:

- Confirm the air cylinders are maintained in a fully charged state and recharged when the pressure falls to 90% of the manufacturer's recommended pressure level.
- Confirm the regulator and warning devices are inspected and activated to ensure that they function properly.

Inspection records for emergency uses respirators include the following required information:



- date of the inspection
- name of the inspector
- the findings of the inspection
- any required remedial action, and
- a serial number or other means of identifying the inspected respirator

#### 12.4. Repair

Respiratory protection equipment that does not pass inspection, or is not working properly (e.g. vapor or gas breakthrough, changes in breathing resistance, facepiece leakage, torn or missing valves) is removed from service, and discarded, repaired, or adjusted in accordance with the following procedures:

Repairs to respirators are made only by persons appropriately trained to perform such operations and use only the respirator manufacturer's NIOSH-approved parts designed for the respirator.

Valves, regulators, and alarms on SCBAs are adjusted and repaired only by the manufacturer or an authorized service representative.

When a respirator is taken out of service, the respirator user is given a replacement of the same make, model, and size before returning to the work area. If the same respirator is not available, the user will need to be fit tested on a new respirator.

#### 12.5. Breathing Air Quality

OSHA's *Standard* requires that employees who are wearing atmosphere-supplying respirators (e.g. SCBA) be provided with breathing air of high purity. Compressed breathing used in the University SCBAs meet the requirements for Grade D breathing air described in "Compressed Gas Association Commodity Specification for Air" (CGA G-7.1-1989) and meet the following:

- Oxygen content between 19.5 to 23.5 percent
- Hydrocarbon content of 5 milligrams per cubic meter of air or less
- Carbon monoxide content of 10 parts per million or less
- Carbon dioxide content of 1,000 ppm or less
- Lack of noticeable odor

Cylinders of breathing air, when refilled, are accompanied by a certificate from the air supplier indicating the provided air tested and found to meet the criteria for Grade D breathing air. Certificates are requested from the air supplier and kept with the SCBA inspection data.

### 13. Voluntary Respirator Use Procedure

Voluntary respirator use is when an employee chooses to wear a respirator for a specific work activity even though the use of a respirator is not required by either the University or by an OSHA standard. At Syracuse University, only N95 (disposable filtering facepiece) respirators are allowed to be used for voluntary use purposes.

An employee may request to voluntarily use an N95 respirator as an extra precaution or for comfort and protection against nuisance dust, or allergens. Requests for voluntary use of respirators are submitted to EHSS for evaluation and approval. An employee approved to voluntarily use a disposable N95 respirator is provided with Appendix D of the OSHA standard (as required by the OSHA Standard) which offers basic advisory information on the proper use of respirators.

An employee acknowledges their decision to voluntarily use a N95 respirator and their understanding of the requirements associated with voluntary use by first completing EHSS's Voluntary Respirator Use advisory training (which includes OSHA's Appendix D). After completing the training, the employee completes and signs an EHSS provided Voluntary Respirator Use

Acknowledgement form. The following is a summary of the requirements that an employee and their supervisor follow to allow the employee to voluntarily wear a respirator in the workplace.

The supervisor of the employee requesting the voluntary use of an N95 respirator:

- Clearly define the activity for which the voluntary respirator use is requested.
- Contact EHSS to perform a respiratory hazard evaluation to verify the planned activity does not require the employee to wear a respirator and participate in the RPP.
- Ensure the employee choosing to voluntarily wear a N95 completes EHSS' Voluntary Respirator Use training, which includes OSHA's Appendix D advisory information and is given EHSS' Voluntary Respirator Use Acknowledgement form.
- Confirm the employee signs the Voluntary Respirator Use Acknowledgement form.
- Provide the signed copy of the employee's Voluntary Respirator Use Acknowledgement form to EHSS.

The employee requesting to voluntarily use an N95 respirator:

- Informs their supervisor of their desire to voluntarily use a N95 respirator and the activity they intend to wear it for.
- Completes EHSS's Voluntary Respirator Use training and signs the provided acknowledgement form, and returns the signed form to their supervisor.
- Procure an N95 respirator (the cost of purchasing the respirator is at the discretion of the Department).
- Read and follow the manufacturer's instructions provided with the N95 respirator.
- Properly use, maintain, and care for the N95 respirator.
- Ensure the N95 respirator is worn appropriately and has a good fit in direct contact with their face. Having facial hair is discouraged while wearing a voluntary N95 respirator.
- Notifies their supervisor if experiencing adverse health effects while wearing the respirator.

## 14. Program Records

The following records associated with the RPP are maintained.

### 14.1. Medical Evaluation Records

EHSS maintains a record for each employee required to use a respirator. The record includes the following information about the employee:

- Name and SU ID number
- A copy of the medical provider's written medical qualification document; and
- A copy of the information that the University provided to the medical provider.

EHSS maintains employee respirator users' medical qualification documents for the duration of the employee's employment plus 30 years and make the records available in accordance with 29 CFR 1910.1020. The occupational medical provider maintains the complete confidential employee medical reports.

### 14.2. Respirator Fit Test Records

- EHSS maintains records of the qualitative fit tests administered to employees in the RPP. These records include:
- The name and SU ID number of the employee tested.
- The type of fit test performed.
- Make, model and size of the respirator tested.
- Date of fit test.
- Results of the fit test (pass/fail)

At a minimum, fit test records are retained until the next fit test is administered or until the employee is no longer in the RPP.

### **14.3. Employee Exposure Monitoring Records**

EHSS maintains an accurate record of exposure monitoring performed to evaluate employee exposures to respiratory hazards. These records include at least the following information:

The date of monitoring for each sample taken.

- The task monitored.
- Sampling and analytical methods used.
- Number, duration, and results of samples taken.
- Identity of the laboratory that performed the analysis if applicable.
- Name and SU ID number of all employees represented by the monitoring, indicating which employees were actually monitored.

EHSS maintains exposure monitoring records in accordance with 29 CFR 1910.1020.

When air monitoring results in the assignment of a respiratory, the work task and respirator type is added to the University's Respiratory Assignment Table found in Appendix B of this RPP Manual.

### **14.4. Objective Data Records**

EHSS maintains an accurate record of all objective data used to evaluate employee exposures to respiratory hazards. This record will include at least the following information:

- The source of the objective data.
- The testing protocol and results of testing.
- A description of the process, task or activity on which the objective data were based, and
- Any other data relevant to the process, task, activity, material, or exposures on which the objective data was based.

EHSS maintains objective data for the duration of the employee's employment plus 30 years and made available if requested in accordance with 29 CFR 1910.1020.

### **14.5. Respirator Protection Program**

EHSS maintains the RPP Manual and makes it available to employees required and approved to use a respirator at the University.

## **15. Program Evaluation**

EHSS periodically evaluates the RPP Manual to confirm it aligns with the current OSHA Standard, current RPP procedures and practices, to help to ensure it continues to be effective. EHSS seeks input on the RPP periodically from respirator users on the effectiveness of the RPP and to identify problems. The RPP Manual is updated as needed to reflect conditions and practices that may have changed.

EHSS documents the evaluation by completing a Respiratory Protection Program Review and Evaluation Form attached as Appendix C. EHSS maintains a copy of the completed form on file.

# Appendix A

## Definition of Terms

Air-purifying respirator: A respirator with an air-purifying filter or cartridge 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.

Cartridge: A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific chemical 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.

Filter or air purifying element: A component used in respirators to remove particulates (solid or liquid aerosols) from the inspired air.

Filtering facepiece (disposable respirator): 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. Often referred to as a N95.

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.

---

## Appendix A

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.

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.

Respiratory Protection Standard: Title 29 US Code of Federal Regulations Section 1910.134.

Permissible Exposure Limit (PEL): An occupational exposure limit specified by OSHA. OSHA PELs establish the maximum level of a specific airborne hazard that an employee can be exposed to, averaged over an 8-hour workday (8-hour time weighted average or TWA) or over a specific portion of a workday (15-minute short-term exposure limit or STEL). OSHA PELs are listed in 29 CFR 1010.1000 and 1926.55.

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.

Supplied-air respirator (SAR) or airline respirator: an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

---