

# Respiratory Protection Program

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Environmental Health, Safety, and Risk Management Department

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## **I. Purpose**

The purpose of Stephen F. Austin State University's (SFA) Respiratory Protection Program is to protect employees from exposure to respiratory hazards in the workplace and to comply with the requirements of OSHA's Respiratory Protection standard, 29 CFR 1910.134. In order to control occupational diseases associated with such exposures, the Respiratory Protection Program's primary objective is to inform employees on how to identify and evaluate respiratory hazards in the workplace, select and use appropriate protective devices for particular hazards, and maintain and care for the respiratory protection equipment. Whenever possible, engineering controls should be utilized to provide protection against respiratory hazards. However, when such controls are not feasible, respiratory protection shall be used.

## **II. Scope**

This Respiratory Protection Program applies to all SFA employees who perform tasks that require the use of respirators during normal work operations or situations where employees are or might be exposed to respiratory hazards including harmful dust, fogs, fumes, mists, gases, smokes, sprays, or vapors and oxygen-deficient atmospheres. Employees participating in the Respiratory Protection Program do so at no cost to themselves. Each department employing personnel where respiratory protection is required is responsible for all training, medical evaluations, fit testing, purchase of respiratory protective equipment and engineering controls.

## **III. Definitions**

For supplementary information on verbiage utilized in this document, please refer to [Appendix A](#) on page 17.

## **IV. Responsibilities**

### **A. Program Administrator(s)**

The Environmental Health, Safety & Risk Management department will serve as the Respiratory Protection Program Administrator(s) for Stephen F. Austin State University. They are responsible for managing the program and maintaining all records pertaining to the program including reviewing and updating the program as necessary, facilitating training and conducting evaluations of program effectiveness. The Environmental Health, Safety & Risk Management department (EHSRM) will assist SFA departments in:

1. Determining when respiratory protection is required
2. Respiratory hazard assessment;
3. Proper selection of engineering controls;
4. Proper selection of respiratory protection;
5. Training requirements;
6. Respirator fit testing; and
7. Maintaining all medical evaluations, training records, and fit test records as required by SFA's document retention schedule.

## **B. SFA Departments**

SFA departments should ensure each employee understands and follows the Respiratory Protection Program through employee orientation, job hazard assessments, training and, if necessary, disciplinary action. SFA departments will provide all necessary information, equipment and financial responsibility for personnel to comply with this program. SFA departments will provide:

1. Respiratory training to ensure the safety of employees;
2. Engineering controls;
3. Fit-testing of respirators;
4. All necessary respirators, cartridges, canisters, filters and replacement parts;
5. Medical evaluations;
6. Facilities and supplies to clean and store respirators; and
7. Labels, Safety Data Sheets (SDS) and other related information to assist with respirator, cartridge and filter selection.

## **C. Departmental Supervisor**

Supervisors will work with the EHSRM Safety Officers to enforce the Respiratory Protection Program at the departmental level. Supervisors should be capable of identifying existing and predictable hazards in the work area and/or hazardous working conditions. In the event supervisors do not feel qualified to identify these hazards, EHSRM Safety Officers are available to train supervisors on current standards. Supervisors are responsible for ensuring employee training (initial and annual), medical evaluation, and fit-testing (initial and annual) is conducted before employees are permitted to use respirators.

## **D. Employees**

Employees share the responsibility for performing proper work practices, following safety rules, maintaining a clean work area and using and maintaining all PPE and equipment in the correct manner. Employees required to use respirators must:

1. Follow the specific rules and guidelines stated in this Respiratory Protection Program and other related material as directed by their supervisor(s) and EHSRM;
2. Inform their supervisor(s) of any change in medical condition that might affect their ability to use a respirator;
3. Report any problems with the respiratory equipment to their supervisor(s); and
4. Trim their beards so that they do not interfere with the sealing surface of the respirator or are not so large that they could interfere with valve function. *(Some types of respirators do not require a face seal and can usually be worn by bearded employees. Specifically, these are positive pressure respirators of the hood and helmet type, and types that can be used with a continuous-flow, supplied-air respirator, where facial hair and beards will have less effect on the fit.)*

**The following steps are required to determine when a respirator is required and what steps must be taken to utilize them one properly.**

## **V. Respiratory Hazard Assessment**

In order for employees to participate in the Respiratory Protection Program, a hazard assessment must first occur. Ideally, after EHSRM Safety Officers aid in identifying uncontrolled respiratory hazards, steps will be taken to eliminate or reduce these hazards to an acceptable risk. If respiratory hazards are unable to be corrected utilizing an engineered approach, respiratory protection with respirators could be necessary. The EHSRM Safety Officer's assessment will provide information that will help:

1. Determine the possible use of administrative and engineering controls to reduce or remove hazards;
2. Determine the need for Respirators and/or other PPE;
3. Determine training needs;
4. Determine emergency/medical response needs; and
5. When changes in the work area are made, the need for additional hazard assessments might be necessary.

## **VI. Contacting EHSRM**

The supervisor of employees participating in the Respiratory Protection Program should contact the EHSRM department in order to initiate training, employee evaluation and further Respiratory Protection Program participation. EHSRM Safety Officers can be contacted by phone at (936) 468-4514 or by email at [safety@sfasu.edu](mailto:safety@sfasu.edu).

## **VII. Requirements for Employees Participating in the Program**

After EHSRM Safety Officers have completed respiratory hazard assessment, affected employees shall be required to participate the Respiratory Protection Program. Before wearing a respirator, employees participating in the Respiratory Protection Program should complete the following steps:

1. The employee receives respirator training as required by OSHA 29 CFR 1910.134.
2. The employee participating in the program contacts EHSRM to fill out a medical evaluation questionnaire.
3. A licensed healthcare professional reviews the employee's confidential medical evaluation questionnaire and authorizes the employee's participation in the program to EHSRM.
4. The employee participates in a qualitative or quantitative respirator fit test appropriate for the respirator class chosen.
5. The employee receives training on selecting a respirator and appropriate cartridges.
6. The employee should utilize proper use and care procedures for his/her respirator to ensure proper protection from potential hazards.
7. Employees shall report any respiratory issues or injuries to their supervisors and EHSRM.

## **VIII. Training**

Employees who are required to use respirators must be properly trained. Training will be comprehensive, understandable and recur at least annually. Sometimes, workers may voluntarily wear respirators to avoid exposures to hazards, even if the amount of

hazardous substance does not exceed the limits set by OSHA standards. Employees who are permitted to use respirators voluntarily must also be provided basic information and training, see [Appendix B](#) on page 19.

#### **A. Initial Training**

Respirator safety training is provided by EHSRM before use and then on an as-needed basis. Initial training must be conducted prior to any employee being assigned to a work area where respiratory protection is required. Refer to [Appendix C](#), page 20, for the employee Respirator Training Documentation Form. This form, or one similar, shall be completed at each training occurrence and submitted to EHSRM via campus mail (Box 6113), e-mail to [safety@sfasu.edu](mailto:safety@sfasu.edu) or fax to 468-7312.

*\*Contact EHSRM at 468-6034 or 468-4442, for more information or to schedule a training class.*

#### **B. Retraining**

Retraining will occur annually or when the following situations arise:

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

### **IX. Employee Evaluations**

#### **A. Medical Evaluation**

Each employee must undergo a medical evaluation to determine if he/she is able to use a respirator prior to being fit tested and required to use the respirator in the workplace. Using a respirator may place a breathing burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used and the medical status of the employee. Therefore, employees participating in the Respiratory Protection Program shall contact EHSRM to complete and submit to a physician or other licensed health care professional (PLHCP) a medical evaluation questionnaire, see [Appendix D](#) on page 21. Prior to the employee utilizing the respiratory equipment and in order to determine the employee's ability to use a respirator, EHSRM shall obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The PLHCP shall provide any additional information such as;

1. Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used;
2. The need, if any, for follow-up medical evaluation; and
3. A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

The written medical determination provided by the PLHCP will be on record at EHSRM and an additional medical evaluation will be provided if:

1. Any employee reports medical signs or symptoms that are related to the ability to use a respirator;
2. A PLHCP or Departmental Supervisor is informed that an employee needs to be reevaluated;
3. Information from the respiratory protection program, including observations made during the fit testing and program evaluation, indicate a need for employee reevaluation; or
4. A change occurs in workplace conditions (i.e., physical work effort, protective clothing, and temperature) that may result in substantial increase in the physiological burden placed on an employee.

#### **B. Fit Testing**

Fit Testing is required for the use of air purifying respirators (APR) and tight-fitting supplied air respirators (SAR). All respirators that rely on a mask-to-face seal need to be annually checked to determine whether the mask provides an acceptable fit to an employee. Currently, the EHSRM Safety Officers conducts fit tests by performing qualitative fit testing while more extensive quantitative fit testing is accomplished through the use of off campus occupational health professionals. In order to plan and schedule a fit test, contact EHSRM at 468-4442. Departmental Supervisors shall receive a copy of the fit test, [Appendix E](#) on page 29, administered to an employee and records shall be retained at EHSRM.

This record must include:

1. Name of employee tested;
2. Type of test performed;
3. Specific make, model, style and size of respirator tested;
4. Date of test; and
5. The pass/fail results for QLFTs.

### **X. Things to consider when Selecting Respirators**

Once employees begin participating in the Respiratory Protection Program, NIOSH certified respirators will be selected and provided based on the respiratory hazards to which employees are exposed, the job site, and user factors that affect respirator performance and reliability.

#### **A. NIOSH Certification**

OSHA requires respirators to be certified by the National Institute for Occupational Safety and Health, or NIOSH, and used in compliance with the conditions of its certification. NIOSH approved respirators are supplied with a label that contains contact information for the respirator manufacturer/supplier, cautions, limitations for use, and directions for proper use. This information should be followed and be available to employees using respirators as part of the Respirator Protection Program.



## **B. Hazard Assessment**

When selecting the appropriate NIOSH certified respirator to be used, the supervisor should contact EHSRM Safety Officers in order to evaluate the respiratory hazard(s) which the worker will be exposed. Selection shall be based on the respirator model and size so that the respirator is acceptable to, and correctly fits the user. Consult the following list to aid in respirator selection:

1. Characteristics of the hazardous operation;
2. Work area characteristics;
3. Material used;
4. Worker's activities;
5. Nature of the respiratory hazard;
6. Type of hazard (contaminant or an oxygen-deficient atmosphere);
7. Physical and chemical properties of the contaminant.
8. Physiological effects on the body;
9. Concentration of the contaminant (as determined by sampling or actual knowledge of the concentration);
10. Established Permissible Exposure Limits (PELs) or Threshold Limit Values (TLVs), or other published guidelines;
11. Immediately dangerous to life and health (IDLH) concentration; and
12. Warning properties of the contaminant.

## **C. Protection Factors**

The assigned protection factor (APF) of a respirator reflects the level of protection that a properly functioning respirator would be expected to provide to a population of properly fitted and trained users. For example, an APF of 10 for a respirator means that the user could expect to inhale no more than one tenth of the airborne contaminant present. Various groups such as American National Standards Institute (ANSI), OSHA and NIOSH have proposed factors for the different types of respirators available. Please refer to [Appendix F](#) on page 30 for a table of APFs for various types of respirators.

# **XI. Proper Use and Care of Respirators**

Employees participating in the Respiratory Protection Program who use respirators in routine and foreseeable hazardous situations should make every attempt to reduce situations that may result in facepiece seal leakage, correctly don respirators, ensure proper cleaning procedures and store respirators in order to prolong

## **A. Facepiece Seal Protection**

Tight-fitting face piece respirators shall **not** be worn by employees whom have the following:

1. Facial hair that comes between the sealing surface of the face piece and the face, or that interferes with valve function; or
2. Any condition that interferes with the face-to-face piece seal or valve function.

Equipment such as corrective glasses, goggles, or other personal protective equipment shall be worn in a manner that does not interfere with the seal of the face piece to the face of the user. For all tight-fitting respirators, employee shall perform a user seal check each time they put on the respirator using the procedures outlined in [Appendix G](#) on page 31.

*If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece, the employee must replace or repair the respirator before returning to the work area.*

## **B. Donning Face Masks**

There are different methods to don an air purifying tight fitting facepiece respirator. The wearer needs to find a method that feels comfortable. The following describes one method which can be used to don a facepiece respirator. Position the adjustable straps (fully extended) to the outside of the mask.

1. Place hands between the straps and the mask, with the straps lying on the back of the hands.
2. Place mask on the face, inserting chin first, working the mask up on the face.
3. Raise hands away from the mask continue movement around the sides of the face until the straps are in place.
4. Adjust the straps until the mask fits tightly on the face (this is done by pulling the straps straight back towards the ears), the bottom straps should be adjusted first.
5. Test the mask by completely covering the cartridges with the palms of your hands or rubber gloves and inhale, if a leak is detected, readjust the straps (hold the end of the air tube against the palm of the hand for supplied air respirators).



## **C. Cleaning & Disinfecting Respirators**

The proper functioning of respirators and ensuring the devices do not pose a hazard to the user require regular maintenance and cleaning. Each respirator issued shall be clean, sanitary, and in good working order. Shared respirators shall be thoroughly cleaned and disinfected between users. In general, respirators should be inspected for basic function prior to each use and cleaned as often as necessary to prevent the occurrence of unsanitary conditions. Emergency use respirators shall be cleaned and disinfected after each use. Please refer to [Appendix H](#) on page 32 for proper instructions on cleaning and disinfecting of respirators.

#### **D. Storage**

In order to prolong life, maintain effectiveness, respirators should be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture and damaging chemicals. They should also be stored to prevent deformation of the facepiece and exhalation valve.



#### **E. Inspection of Respirators**

All respirators shall be inspected routinely for function, tightness of connections, and the condition of various parts. Check parts for pliability and signs of deterioration. Respirators that fail inspection or, are found to be defective must be removed from use and discarded or repaired by appropriately trained persons using the manufacturer's NIOSH-approved parts designed for the respirator.

**There are two types of respirators utilized within a majority of SFA's departments, Air Purifying Respirators and Self Contained Breathing Apparatus. See the details below for information on both styles of respirators.**

## **XII. Air Purifying Respirators (APR) and Requirements**

### **A. Limitations**

Air purifying respirators remove specific contaminants from the air by passing the air through a filter, cartridge, or canister. Air purifying respirators are limited in the protection they provide, so it is necessary to understand their limitations, how to select the correct type, and how to use them.

The following limitations must be considered when using an air purifying respirator:

1. Cannot be used in atmospheres immediately dangerous to life and health (IDLH);
2. Cannot be used in atmospheres with less than 19.5% oxygen;
3. Cannot be used when contaminant concentrations are unknown or when established maximum levels have been exceeded;
4. Proper cartridge must be selected for the contaminant;
5. Relative humidity might reduce the effectiveness of the sorbent;
6. Cartridges/canisters should only be used for chemicals having adequate warning properties (odor, taste, or irritant effects are detectable below the TLV or PEL) or the cartridge/canister has an approved end-of-service-life indicator;
7. Cartridges/canisters are specific to the brand of respirators (e.g. 3M cartridges must be used with a 3M mask).

## B. Classes of air purifying respirators



Canister Type  
Gas Mask

Powered air Purifying  
Respirator (PAPR)

### 1. Disposable Dust Respirators and Masks

- Available for voluntary use  
*See [Annex B](#) on page 19 for more information on voluntary use of respirators*
- Made of cloth or paper
- NIOSH/MSHA approved dust respirators provide protection against nuisance dusts (i.e. N-95)
- Difficult to fit test and to obtain a good face piece-to-face seal

### 2. Half Mask Respirators

- Acceptable for Qualitative fit testing procedures (QLFT)
- Uses one or two cartridges
- Approved for vapors, dusts, fumes, mists, and gases

### 3. Full-Face Mask Respirators

- Acceptable for Qualitative fit testing procedures (QLFT)
- Provides more protection than half mask respirators (e.g. eye protection and a higher protection factor)
- Approved for same contaminants as half mask respirators, but higher concentrations

### 4. Powered Respirators

- Require Quantitative fit testing (QNFT) because of high protection factors
  - Performed by off campus occupational health professional. For more information, contact EHSRM Safety Officers.
- Have no breathing resistance
- Can be used with half masks, full-face masks, and helmets

## XIII. Air Purifying Filter Considerations

Respirators utilize a filtration device called an air purifying element to remove solid or liquid aerosols from the air. Respirators have a variety of options for protection based on the air purifying elements selected. Air purifying elements are available in a canister or cartridge form and must be properly selected, stored, maintained and replaced in order to provide adequate protection to the user.

**The following types of air purifying elements are available for Air Purifying Respirators:**

### **A. Canisters vs. Cartridges**

Canisters remove vapors and gases from the air, have a large sorbent volume, and provide protection against higher concentrations of vapors and gases. Cartridges also remove vapors and gases from the air, but contain less sorbent than canisters and have a shorter usage life.

### **B. Canister and Cartridge Selection**

1. Canisters and cartridges are color-coded to indicate contaminants which they protect against, see [Appendix I](#) on page 33.
2. The canister or cartridge selected must be made by the same manufacturer and be compatible with the respirator in use.
3. If a worker is exposed to two or more chemicals and a combination canister or cartridge is not available, then a supply air respirator should be used.

### **C. Canister and Cartridge Replacement**

Canisters and Cartridges must be replaced if any of the following conditions occur:<sup>1</sup>

1. Canister/cartridge develops an uncomfortably high temperature (due to chemical absorption reaction);
2. Wearer detects an odor or taste, or feels eye or throat irritation;
3. Shelf-life date is expired;
4. The end-of-service-life indicator changes color (if applicable);
5. Canister/cartridge becomes wet or is grossly contaminated; or
6. Physical damage is noticed.

### **D. Disposable Dust Respirators and Masks**

Disposable Dust Respirators must be replaced if the following conditions occur:<sup>2</sup>

1. Breathing becomes difficult;
2. Filter or dust respirators become physically damaged (tears, holes, etc.);
3. Filter or dust respirator is visibly dirty;
4. Filter or dust respirator becomes wet; or
5. The inside of the dust respirator becomes contaminated.

## **XIV. Self-Contained Breathing Apparatus (SCBA) and Requirements**

Atmosphere supplying respirators require a separate source for breathing air. This source could be a cylinder which is carried by the user (self-contained breathing apparatus), a compressor or cylinders which provide air to the user from a distant location via an airline (airline device), or breathing air from a distant location which is directed to the user via a hose (hose mask).

### **A. Limitations**

The period over which the device will provide protection is limited by the amount of air or oxygen in the apparatus, the ambient atmospheric pressure, and the type of

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<sup>1</sup> *Canisters and Cartridges must be replaced a minimum of two weeks after use even if none of the above conditions occur.*

<sup>2</sup> *All cartridges and dust pads must be disposed of within two weeks.*

work being performed. Chief limitations of SCBA devices are their weight or bulk, or both, limited service life, and the training required for their maintenance and safe use. Some SCBA devices have a short service life (less than 15 minutes) and are suitable only for escape (self-rescue) from an irrespirable atmosphere. Also, the air in the cylinder must be at least Grade D as determined by the Compressed Gas Association Commodity Specification for Air, G-7.1.

## B. Care and Use of A SCBA

In addition to the general requirements found in the [Proper use and Care section](#), page 9, there are specific requirements and considerations which must be followed for SCBA wearers.

1. Because SCBAs are complex and require a thorough understanding of their use and care, SCBAs manufacturer's Standard Operating Procedure should be reviewed before use.
2. Per OSHA standards SCBAs used for emergency use be inspected once a month and records should be maintained of the inspection.
3. During inspection, if the air or oxygen percentage indicates below 90% capacity, the cylinder must be recharged according to the manufacturer's instructions.
4. After each use air or oxygen cylinders should be fully charged according to the manufacturer's instructions.
5. Determine at least monthly that the regulator and warning devices on the SCBA function properly.
6. Follow the "Use and Care" instructions for the SCBA which are usually mounted inside the carrying case lid.
7. Frequently monitor the pressure gauge on the SCBA which indicates the volume of air remaining in the cylinder.
8. Warning devices will signal an alarm when 20-25% of service time remains.

## C. Classes of SCBA



Hooded Pressure Demand



Full Face Pressure Demand

### 1. Hooded Pressure Demand SCBA

- Utilizes a hood to accommodate street glasses or facial shapes that would be problematic for a conventional facepiece.

- Provides respirator protection in hazardous environments and may be used for entrance into and escape from atmospheres that are immediately dangerous to life or health.
- Must **not** be used in the presence of high heat.
- Require Quantitative (QNFT) Fit Testing because of high protection factors
  - Performed by off campus occupational health professionals. For more information, contact EHSRM Safety Officers.

## **2. Full Face Pressure Demand SCBA**

- Provides respirator protection in hazardous environments and may be used for entrance into and escape from atmospheres that are immediately dangerous to life or health.
- Must **not** be used in the presence of high heat.
- Require Quantitative (QNFT) Fit Testing because of high protection factors
  - Performed by off campus occupational health professionals. For more information, contact EHSRM Safety Officers.

### **D. Donning a SCBA**

There are different methods to don a SCBA. The wearer needs to find a method that feels comfortable. The following describes one method which can be used to don a SCBA:

1. Remove SCBA from the case, locate cylinder gauge and check the air pressure;
2. Position the SCBA with the cylinder down, harness toward the wearer, and cylinder control valve pointing toward the body (the SCBA can be placed on the ground or preferably on a table);
3. Grasp shoulder strap on which the regulator is mounted with the right hand
4. Pick up SCBA, place left arm through the strap supported by the right hand, placing strap on left shoulder;
5. Remove right hand from the left shoulder strap, place right arm into the remaining strap;
6. Grasp both shoulder straps near the shoulders and complete positioning of the SCBA, lock snaps, and adjust the straps
7. The following method can be used to don the hooded face mask utilized with SCBA at SFA:
  - a. Position the adjustable straps (fully extended) to the outside of the mask;
  - b. Place hands between the straps and the hooded mask, with the straps laying on the back of the hands;
  - c. Place mask on the face, inserting chin first, working the hood around the face;
  - d. Raise hands away from the hood, continue movement around the sides of the face until the straps are in place;
  - e. Adjust straps until the hood fits tightly on the face (this is done by pulling the straps straight back toward the ears), the bottom straps should be adjusted first; and
  - f. Test the hood by holding the end of the air tube against the palm of the hand, inhale, if a leak is noted, readjust the straps.

### **E. Use of SCBA in Dangerous Atmospheres**

Only full-face pressure demand SCBA respirators are acceptable for use when toxic or oxygen deficient atmospheres may be present or if the identity of the contaminant is unknown. Personnel who may encounter dangerous atmospheres in normal operations or emergencies must be familiar with the following procedures.

1. One additional person must be present in areas where, if a respirator fails, the respirator wearer could be overcome by a toxic or oxygen deficient atmosphere.
2. Communications must be maintained between the individuals present; the communications can include visual, voice, or signal line.
3. An additional person equipped with rescue equipment including a SCBA must be in a nearby safe area where he can assist the others in case of an emergency.
4. When a SCBA is used in an atmosphere immediately dangerous to life and health, standby personnel must be present with rescue equipment.
5. Any respirator wearers in an atmosphere immediately dangerous to life and health must be equipped with safety harnesses and safety lines so they can be removed if they are overcome.
6. For respirator use in confined spaces consult the SFA Confined Space Program and contact EHSRM.

### **XV. Accident, Injury and Emergency Reporting**

In the event of an emergency, employees should first call 911. Dialing 911 from any University phone will be connected to campus police. Dialing 911 from a cell phone will be connected to the Nacogdoches Police Department. Therefore, it may be pertinent to request to be transferred to the campus police department if experiencing emergencies on campus.

The goal of the EHSRM department is zero injuries. However, in the event of an accident or injury, a 24 hour quick link is available at the EHSRM website. This injury reporting system must be completed by the employee's supervisor or the employee involved in the accident in order to pursue medical treatment through SFA's workers compensation program. Please contact EHSRM at 468-4514 for details.



## **APPENDIX A: Definitions**

*Air- Purifying Respirator:* A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

*Atmosphere – Supplying Respirator:* A respirator that supplies the 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, catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

*Program Administrator:* Designated person who is qualified by appropriate training or experience to oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

*Demand Respirator:* An atmosphere-supplying respirator that admits breathing air to the face piece only when negative pressure is created inside the face piece 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 exits.

*Filter or Air Purifying Element:* A component used in respirators to remove solid or liquid aerosol from the inspired air.

*Filtering Face Piece (dusk mask):* A negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece 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 protocol to qualitatively and quantitatively evaluate the fit of a respirator on an individual (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

*Helmet:* A rigid respiratory inlet covering that also provides head protection against impact and penetration.

*High Efficiency Particulate Air (HEPA) Filter:* A filter that is at least 99.97% efficient in removing mono-disperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are 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, causes irreversible adverse health effects, or impairs an individual's ability to escape from a dangerous atmosphere.

Loose-Fitting Face Piece: A respirator inlet covering that is designed to form a partial seal with the face.

Negative Pressure Respirator (tight fitting): A respirator in which the air pressure inside the face piece is negative during inhalation with respect to ambient air pressure outside the respirator.

Oxygen Deficient Atmosphere: An atmosphere with 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/her to independently provide, or be delegated the responsibility to provide, some or all of the health care services.

Positive Pressure Respirator: A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air through air-purifying elements to the inlet covering.

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 face piece when the positive pressure is reduced inside the face piece by inhalation.

Qualitative Fit Test (QLFT): A pass/fail 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 face piece, helmet, hood, suit, or a mouthpiece respirator with a 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.

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.

Tight-Fitting Face Piece: 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.

## **APPENDIX B: Voluntary Use of Respirators**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

Take the following precautions:

1. Read and adhere to all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

# APPENDIX C: Respiratory Protection Training Form

Stephen F. Austin State University

**Employee:** \_\_\_\_\_

**Division:** \_\_\_\_\_

**Employee Job Title:** \_\_\_\_\_

## Training Topics

- A. Why medical evaluation, and fit testing is required before utilizing respirators.*
- B. Recognition of medical signs and symptoms that may limit or prevent the effective use of the respirators.*
- C. Why a respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.*
- D. Limitations and capabilities of the respirator.*
- E. Use in emergency situations, including situations in which the respirator malfunctions.*
- F. How to inspect, don and remove, use, and check the seals of the respirator.*
- G. Maintenance and storage procedures for respirators.*

*Additional Training Guides:* \_\_\_\_\_

\_\_\_\_\_

**Training Conducted By:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Employee Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

# APPENDIX D: Medical Evaluation

## OSHA MANDATED RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

To the Department/Supervisor: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee: Your employer must allow you to answer this questionnaire during normal working hours or at a time and place that are convenient for you. To maintain HIPPA compliance and your medical confidentiality, your employer or supervisor is not allowed to review your answers without your permission. Your employer will instruct you on how to deliver or send this questionnaire to the health care professional for review.

### Section 1

(Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: \_\_\_\_\_
2. Your name: \_\_\_\_\_
3. Your age (to nearest year): \_\_\_\_\_
4. Sex (circle one): Male/Female
5. Your height: \_\_\_\_\_ ft. \_\_\_\_\_ in.
6. Your weight: \_\_\_\_\_ lbs.
7. Your job title: \_\_\_\_\_
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): \_\_\_\_\_
9. The best time to phone you at this number: \_\_\_\_\_
10. Has your employer instructed you on how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
  - a. \_\_\_\_\_ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
  - b. \_\_\_\_\_ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you previously worn a respirator (circle one): Yes/No  
If "yes," what type(s): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Section 2.Part A

(Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you **currently** smoke tobacco, or have you smoked tobacco in the last month?  
Yes No
2. Have you **ever had** any of the following conditions?
  - a. Seizures (fits) Yes No
  - b. Diabetes (sugar disease) Yes No
  - c. Allergic reactions that interfere with your breathing Yes No
  - d. Claustrophobia (fear of closed-in places) Yes No
  - e. Trouble smelling odors Yes No
3. Have you **ever had** any of the following pulmonary or lung problems?
  - a. Asbestosis Yes No
  - b. Asthma Yes No
  - c. Chronic bronchitis Yes No
  - d. Emphysema Yes No
  - e. Pneumonia Yes No
  - f. Tuberculosis Yes No
  - g. Silicosis Yes No
  - h. Pneumothorax (collapsed lung) Yes No
  - i. Lung cancer Yes No
  - j. Broken ribs Yes No
  - k. Any chest injuries or surgeries Yes No
  - l. Any other diagnosed lung condition not listed Yes No
4. Do you **currently** have any of the following symptoms of pulmonary or lung illness?
  - a. Shortness of breath Yes No
  - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline  
Yes No
  - c. Shortness of breath when walking with other people at an ordinary pace on level ground  
Yes No
  - d. Have to stop for breath when walking at your own pace on level ground Yes No
  - e. Shortness of breath when washing or dressing yourself Yes No
  - f. Shortness of breath that interferes with your job Yes No
  - g. Coughing that produces phlegm (thick sputum) Yes No
  - h. Coughing that wakes you early in the morning Yes No
  - i. Coughing that occurs mostly when you are lying down Yes No
  - j. Coughing up blood in the last month Yes No
  - k. Wheezing Yes No
  - l. Wheezing that interferes with your job Yes No
  - m. Chest pain when you breathe deeply Yes No
  - n. Any other symptoms that may possibly be related to lung problems Yes No

5. Have you *ever had* any of the following cardiovascular or heart problems?

- |  |     |    |
|--|-----|----|
| a. Heart attack  | Yes | No |
| b. Stroke  | Yes | No |
| c. Angina  | Yes | No |
| d. Heart failure   | Yes | No |
| e. Swelling in your legs or feet (not caused by walking) | Yes | No |
| f. Heart arrhythmia (heart beating irregularly)          | Yes | No |
| g. High blood pressure                                   | Yes | No |
| h. Any other diagnosed heart problems                    | Yes | No |

6. Have you *ever had* any of the following cardiovascular or heart symptoms?

- |   |     |    |
|---|-----|----|
| a. Frequent pain or tightness in your chest   | Yes | No |
| b. Pain or tightness in your chest during physical activity                         | Yes | No |
| c. Pain or tightness in your chest that interferes with your job                    | Yes | No |
| d. In the past two years, noticed your heart skipping or missing a beat             | Yes | No |
| e. Heartburn or indigestion that is not related to eating                           | Yes | No |
| f. Any other symptoms that may possibly be related to heart or circulation problems | Yes | No |

7. Do you *currently* take medication for any of the following problems?

- |                               |     |    |
|-------------------------------|-----|----|
| a. Breathing or lung problems | Yes | No |
| b. Heart trouble              | Yes | No |
| c. Blood pressure             | Yes | No |
| d. Seizures (fits)            | Yes | No |

8. If you've used a respirator, have you *ever had* any of the following problems? (If you've never used a respirator, check the box for N/A and proceed to question 9)

- |  |     |    |
|--|-----|----|
| a. Eye irritation  | Yes | No |
| b. Skin allergies or rashes  | Yes | No |
| c. Anxiety   | Yes | No |
| d. General weakness or fatigue                                     | Yes | No |
| e. Any other problem that interferes with your use of a respirator | Yes | No |
| <input type="checkbox"/> N/A                                       |     |    |

9. Would you like to talk to the health care professional who will review this questionnaire regarding your answers: Yes No

Every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA) must answer questions 10 to 15 below. For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you *ever lost* vision in either eye (temporarily or permanently) Yes No

11. Do you *currently* have any of the following vision difficulties?

- |                                    |     |    |
|------------------------------------|-----|----|
| a. Wear contact lenses             | Yes | No |
| b. Wear glasses                    | Yes | No |
| c. Color blind                     | Yes | No |
| d. Any other eye or vision problem | Yes | No |

12. Have you *ever had* an injury to your ears, including a broken ear drum? Yes No

13. Do you *currently* have any of the following hearing problems?

- |                                     |     |    |
|-------------------------------------|-----|----|
| a. Difficulty hearing               | Yes | No |
| b. Wear a hearing aid               | Yes | No |
| c. Any other hearing or ear problem | Yes | No |

14. Have you *ever had* a back injury? Yes No

15. Do you *currently* have any of the following musculoskeletal problems?

- |   |     |    |
|---|-----|----|
| a. Weakness in any of your arms, hands, legs, or feet                           | Yes | No |
| b. Back pain  | Yes | No |
| c. Difficulty fully moving your arms and legs                                   | Yes | No |
| d. Pain or stiffness when you lean forward or backward at the waist             | Yes | No |
| e. Difficulty fully moving your head up or down                                 | Yes | No |
| f. Difficulty fully moving your head side to side                               | Yes | No |
| g. Difficulty bending at your knees   | Yes | No |
| h. Difficulty squatting to the ground   | Yes | No |
| i. Climbing a flight of stairs or a ladder carrying more than 25 lbs            | Yes | No |
| j. Any other muscle or skeletal problem that interferes with using a respirator | Yes | No |

## Section 2.Part B

Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional reviewing the questionnaire.

1. In your present job, are you working in a place that has lower than normal amounts of oxygen?

Yes No

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions

Yes No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals?

Yes No

If "yes," name the chemicals: \_\_\_\_\_

---

---

---



3. Have you ever worked with any of the materials, or under any of the conditions, listed below?

- |   |     |    |
|---|-----|----|
| a. Asbestos   | Yes | No |
| b. Silica ( <i>e.g.</i> , in sandblasting)                            | Yes | No |
| c. Tungsten/cobalt ( <i>e.g.</i> , grinding or welding this material) | Yes | No |
| d. Beryllium  | Yes | No |
| e. Aluminum   | Yes | No |
| f. Coal (for example, mining)   | Yes | No |
| g. Iron   | Yes | No |
| h. Tin  | Yes | No |
| i. Dusty environments   | Yes | No |
| j. Any other hazardous exposures                                      | Yes | No |

If "yes," describe these exposures:

---

---

4. List any second jobs or side businesses you have: \_\_\_\_\_

---

5. List your previous occupations: \_\_\_\_\_

---

6. List your current and previous hobbies: \_\_\_\_\_

---

7. Have you been in the military services? Yes No

If "yes," were you exposed to biological or chemical agents (either in training or combat):

Yes No

8. Have you ever worked on a HAZMAT team? Yes No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures previously mentioned, are you taking any other medications for any reason (including over-the-counter medications)? Yes No

If "yes," list the medications: \_\_\_\_\_

---

10. Will you be using any of the following items with your respirator(s)?

- |                                       |     |    |
|---------------------------------------|-----|----|
| a. HEPA Filters                       | Yes | No |
| b. Canisters (for example, gas masks) | Yes | No |
| c. Cartridges                         | Yes | No |

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you):

- |                                      |     |    |
|--------------------------------------|-----|----|
| a. Escape only (no rescue)           | Yes | No |
| b. Emergency rescue only             | Yes | No |
| c. Less than 5 hours <i>per week</i> | Yes | No |
| d. Less than 2 hours <i>per day</i>  | Yes | No |
| e. 2 to 4 hours per day              | Yes | No |
| f. Over 4 hours per day              | Yes | No |

12. During the period you are using the respirator(s), is your work effort:

- |   |     |    |
|---|-----|----|
| a. <b>Light</b> (less than 200 kcal per hour) | Yes | No |
|---|-----|----|

If "yes," how long does this period last during the average shift: \_\_\_\_\_hrs. \_\_\_\_\_mins.

Examples of a light work effort are **sitting** while writing, typing, drafting, or performing light assembly work; or **standing** while operating a drill press (1-3 lbs.) or controlling machines.

- |   |     |    |
|---|-----|----|
| b. <b>Moderate</b> (200 to 350 kcal per hour) | Yes | No |
|---|-----|----|

If "yes," how long does this period last during the average shift: \_\_\_\_\_hrs. \_\_\_\_\_mins.

Examples of moderate work effort are **sitting** while nailing or filing; **driving** a truck or bus in urban traffic; **standing** while drilling, nailing, performing assembly work, or transferring a moderate load (approx. 35 lbs.) at trunk level; **walking** on a level surface about 2 mph or down a 5° degree grade about 3 mph; or **pushing** a wheelbarrow with a heavy load (approx. 100 lbs.) on a level surface.

- |   |     |    |
|---|-----|----|
| 3. <b>Heavy</b> (above 350 kcal per hour) | Yes | No |
|---|-----|----|

If "yes," how long does this period last during the average shift: \_\_\_\_\_hrs. \_\_\_\_\_mins.

Examples of heavy work are **lifting** a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; **shoveling; standing** while bricklaying or chipping castings; **walking** up an 8° degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator? Yes No

If "yes," describe this protective clothing and/or equipment: \_\_\_\_\_

14. Will you be working under hot conditions (temperature exceeding 77°F) Yes No

15. Will you be working under humid conditions Yes No



## **AUTHORIZATION FOR RELEASE OF INFORMATION**

Patient: \_\_\_\_\_

TO WHOM IT MAY CONCERN:

You are hereby expressly authorized to release and furnish to Stephen F. Austin State University's Environmental Health Safety and Risk Management Department and/or any associate, assistant, representative, agent or employee thereof, any and all desired information (including, but not limited to, office records, medical reports, memos, hospital records, laboratory reports, including results of any and all tests including alcohol and/or drug test, X-rays, X-ray reports, pulmonary function tests, including copies thereof) pertaining to the physical and/or mental condition which is the basis of my medical evaluation for participation in Stephen F. Austin State University's Respiratory Protection Program. This includes not only all current and/or future information but also all past medical information which is related to the medical questionnaire and the basis of my evaluation.

(Print Name) \_\_\_\_\_

Photostatic copies of this signed authorization will be considered as valid as the original.

SIGNED: \_\_\_\_\_ DATED: \_\_\_\_\_

PLEASE SIGN THE ABOVE MEDICAL AUTHORIZATION AND RETURN IT, SO WE MAY SECURE RELEASE OF YOUR MEDICAL RECORDS.

THANK YOU

Stephen F. Austin State University  
Environmental Health Safety and Risk Management

## APPENDIX E: Respirator Fit Test Form

Name: \_\_\_\_\_ CID #: \_\_\_\_\_  
Department: \_\_\_\_\_ Job Title \_\_\_\_\_  
Respirator Type & Model: \_\_\_\_\_

**Conditions Affecting the Respirator Fit:**

None \_\_\_\_\_ Light Beard \_\_\_\_\_ Heavy Beard \_\_\_\_\_ Moustache \_\_\_\_\_  
Glasses \_\_\_\_\_ Dentures Absent \_\_\_\_\_ Other \_\_\_\_\_  
Comments: \_\_\_\_\_  
\_\_\_\_\_

**Fit Checks:**

Negative Pressure	Pass _____	Fail _____	Not Done _____
Positive Pressure	Pass _____	Fail _____	Not Done _____

**Fit Testing:**

Quantitative _____	Fit Factor _____	
Qualitative _____	<u>Isoamyl Acetate</u>	<u>Bitrex</u>
	Pass _____	Pass _____
	Fail _____	Fail _____

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This is a mandated OSHA respirator fit test administered by the Stephen F Austin State University (SFA) Environmental Health, Safety and Risk Management Department. The results indicate the performance of the listed respiratory device, as fitted on the participant stated herein under controlled conditions. Fit testing as performed measures the ability of the respiratory protective device to provide protection to the individual tested. SFA provides no guarantee, expressed or implied, that this or an identical respiratory protective device will provide adequate protection under conditions other than those present when this test was performed. Furthermore, SFA and its administrator shall not be responsible for any pre-existing or other medical conditions that may occur while taking the test. Should the tests be halted for any reason, or is deemed a "Fail" in the fit results, the SFA representative administering the test shall have the right to refuse the participant a completion of the respirator fit test. It is understood that some classes require tested, properly fitted individual respirators that may be retested at SFA's discretion and a required fit test on the participant and respirator equipment on an annual basis.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Printed name \_\_\_\_\_

Printed name \_\_\_\_\_

**SFA Test Administrator**

**Participant**

## APPENDIX F: Respirator Protection Factors

Respirator Class & Type	OSHA (Cadmium Std.)	NIOSH
<b><i>Air Purifying</i></b>		
Filtering Face piece	10	10
Half-Mask	10	10
Full-Face piece	50	50
<b><i>Powered Air Purifying</i></b>		
Half-Mask	50	50
Full-Face piece	1000	50
Loose Fitting Face piece	25	25
Hood or Helmet	25	25
<b><i>Supplied Air</i></b>		
Half-Mask-Demand	10	10
Half-Mask-Continuous	50	50
Half-Mask-Pressure Demand	50	1000
Full-Face piece Demand	50	50
Full-Face piece Continuous Flow	1000	50
Full-Face piece Pressure Demand	1000	2000
Loose Fitting Face piece	25	25
Hood or Helmet	25	25
<b><i>Self-Contained Breathing Apparatus (SCBA)</i></b>		
Full-Facepiece Demand	50	50
Full-Facepiece Pressure Demand	10,000	10,000
Hood or Helmet Demand	50	50,
Hood or Helmet Pressure Demand	10,000	10, 000

## APPENDIX G: User Seal Check Procedures

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved **each time the respirator is worn**. User seal checks are not substitutes for qualitative or quantitative fit tests.

### Face piece Positive and/or Negative Pressure Checks

#### *Positive pressure check*

-Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.



#### *Negative pressure check*

-Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

## APPENDIX H: Respirator Cleaning Procedures



1. Remove filters, cartridges, and canisters. Disassemble the face piece by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair defective parts.
2. Wash components in warm (110° F maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
3. Rinse components thoroughly in clean, warm, preferably running water.
4. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
  - Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 110° F or;
  - Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 110°F or;
  - Other commercially available disinfectant cleaners, if their use is recommended or approved by the respirator manufacturer.
5. Components should be hand-dried with a clean lint-free cloth or air-dried.
6. Reassemble face piece, replacing filters, cartridges, and canisters where necessary.
7. Test the respirator to ensure that all components work properly.



## APPENDIX I: Air Purifying Cartridge Color Codes

<b>Contaminants To Be Protected Against</b>	<b>Colors Assigned and/or Components</b>
<b>Acid Gases</b>	<i>White</i>
<b>Hydrocyanic Acid Gas</b>	<i>White with 1/2 inch green stripe completely around the canister near the bottom</i>
<b>Chlorine Gas</b>	<i>White with 1/2 inch yellow stripe completely around the canister near the bottom</i>
<b>Organic Vapors</b>	<i>Black</i>
<b>Ammonia Gas</b>	<i>Green</i>
<b>Acid Gases &amp; Ammonia Gas</b>	<i>Green with 1/2 inch white stripe completely around the canister near the bottom</i>
<b>Carbon Monoxide</b>	<i>Blue</i>
<b>Acid Gas &amp; Organic Vapors</b>	<i>Yellow</i>
<b>Hydrocyanic Acid Gas &amp; Chloropicrin Vapor</b>	<i>Yellow with 1/2 inch blue stripe completely around the canister near the bottom</i>
<b>Acid Gases, Organic Vapors, Ammonia Gases</b>	<i>Brown</i>
<b>Radioactive Materials, Except Tritium &amp; Noble Gases</b>	<i>Purple(Magenta)</i>
<b>Pesticides</b>	<i>Organic vapor canister plus a filter</i>
<b>Multi-Contaminant and CBRN agent</b>	<i>Olive</i>
<b>Any particulates - P100</b>	<i>Purple</i>
<b>Any particulates - P95, P99, R95, R99, R100</b>	<i>Orange</i>
<b>Any particulates free of oil - N95, N99, or N100</b>	<i>Teal</i>
<b>Particulates (Dusts, Fumes, Mists, Fogs, Smoke) in Combination with any of the above gases or vapors</b>	<i>Canister color for contaminant, as designated above, with 1/2 inch gray stripe completely around the canister near the top</i>

*Note: Orange should be use as a complete body or stripe color to represent gases not included in this table.*