

ENVIRONMENTAL HEALTH & SAFETY  
THE UNIVERSITY OF TEXAS AT TYLER



**UT Tyler**<sup>™</sup>  
THE UNIVERSITY OF TEXAS AT TYLER

# RESPIRATORY PROTECTION PROGRAM

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**The University of Texas at Tyler**  
**RESPIRATORY PROTECTION PROGRAM**

## **1. INTRODUCTION**

Potential exposure to respiratory hazards may occur while performing routine tasks or during specialized work such as in confined spaces. To prevent potential occupational illnesses caused by exposure to airborne contaminants utilizing guidance from Occupational Health and Safety Administration (OSHA) Respiratory Protection Standard, Environmental Health and Safety (EH&S) has developed a Respiratory Protection Program. Respiratory Protection Program measures shall be used only after all other engineering and/or administrative controls have been exhausted. This guiding principle should be the focus of supervisors and EH&S staff as they assess the need for respiratory protection.

Respiratory protection is available to personnel subject to exposure to concentrations of dusts, gases, fumes, mists, and toxic materials above OSHA established permissible exposure limits (PEL), and/or working in atmospheres deficient in oxygen. If necessary, respiratory protection will be made available to personnel handling laboratory animals or other special tasks.

Avoiding or minimizing exposure to harmful substances can protect the respiratory system; however, in some cases this may not be possible and use of an appropriate respiratory protective device may be required. Use of respirator can reduce exposure to many contaminants present in that environment; therefore, proper selection of a respirator for the condition at hand is necessary.

## **2. PURPOSE**

This program is designed to establish acceptable practices for respirator use, delineate responsibilities, provide guidance on proper selection, individual fit testing, use and care of respirators in accordance with National Institute of Occupational Safety and Health (NIOSH) standards and University policy.

## **3. APPLICABILITY**

This program applies to all University departments and their employees whose job responsibilities require the use of respiratory protection based on potential exposure to a hazardous environment.

## 4. DEFINITIONS

**Aerosol** is solid or liquid particles suspended in air.

**Air-purifying respirator** is a respirator in which ambient air is passed through an air purifying element, removing contaminants. Air is passed through the air purifying element by means of the breathing action or by a blower.

**ANSI** American National Standard Institute

**Assigned protection factor (APF)** is the minimum expected workplace level of respiratory protection that would be provided by a properly functioning respirator.

**Atmosphere-supplying respirator** is a class of respirators that supply a respirable atmosphere independent of the workplace atmosphere.

**Canister/cartridge** is a container with a filter, sorbent, or catalyst or combination which removes specific contaminants from the air as it passes through it.

**Ceiling concentration** is the concentration of an airborne substance that shall not be exceeded during any part of the working exposure.

**Certified** items are evaluated and listed as permissible by the National Institute for Occupational Safety and Health (NIOSH) or the Mine Safety and Health Administration (MSHA).

**Confined space** is an enclosed space which has limited openings for entry and exit, unfavorable natural ventilation that could contain or produce dangerous air contaminants, could contain a hazardous atmosphere, and which is not intended for continuous occupancy.

**Contaminant** is a harmful, irritating, or nuisance airborne material.

**Continuous flow respirator** is an atmosphere supplying respirator which provides a continuous flow of respirable gas to the respiratory inlet covering.

**Demand respirator** is an atmosphere supplying respirator, which admits respirable gas to the facepiece only when a negative pressure is created by inhalation.

**Dust** is an aerosol consisting of mechanically produced solid particles derived from the breaking up of larger particles.

**End-of-service-life indicator (ESLI)** is 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.

**Escape-only respirator** is a respirator intended only for use during emergency egress from a hazardous atmosphere.

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

**Fit or seal check** is a test conducted by the user to determine if the respirator is properly seated to the face.

**Fit test** is the use of a challenge agent to evaluate the fit of a respirator to a particular individual.

**Fume** is solid aerosols formed by condensation of a gas or a vapor. Fumes generally have a smaller particle size when compared to dusts.

**Hazardous atmosphere** is an atmosphere that contains contaminants in excess of the exposure limits or is oxygen deficient.

**Helmet** is a hood that offers head protection against impact or penetration.

**High efficiency particulate air (HEPA) filter** is a filter, which removes from air 99.97% or more of aerosols having a diameter of 0.3 micrometer.

**Hood** is a respiratory inlet covering which completely covers the head, neck, and may cover portions of the shoulder.

**Immediately dangerous to life or health (IDLH)** is any atmosphere that poses an immediate hazard to life or poses immediate irreversible debilitating effects on health.

**Loose fitting facepiece** is a respiratory inlet covering that is designed to form a partial seal with the face and may or may not protect the head against impact or penetration.

**Maximum use concentration (MUC)** is 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 assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance.

**Mist** An aerosol composed of liquid particles.

**Negative pressure respirator** is a respirator in which the air pressure inside the respiratory inlet covering is negative during inhalation with respect to the ambient air pressure.

**National Institute of Occupational Safety and Health (NIOSH)** is the standard for respirators and associated equipment.

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

**Permissible Exposure Limit (PEL)** is the maximum allowable concentration of a contaminant in the air to which an individual may be exposed. It may be expressed in short term or ceiling limits.

**Poor warning properties** are found in substances that its odor, taste or irritation effects are not detectable and not persistent at concentrations at or below the exposure limit.

**Positive pressure respirator** is a respirator in which the pressure inside the respiratory inlet covering is normally positive with respect to ambient air pressure.

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

**Pressure demand respirator** is a positive pressure atmosphere supplying respirator, which admits respirable, gas when the positive pressure is reduced inside the facepiece by inhalation.

**Qualitative fit test** is a pass/fail fit test that relies on the individual's sensory response to detect the challenge agent.

**Quantitative fit test** is a fit test that uses an instrument to measure the challenge agent inside and outside the respirator.

**Respirator** is a personal device designed to protect the wearer from the inhalation of hazardous atmosphere.

**Respiratory inlet covering** is the portion of a respirator, which connects the wearer's respiratory tract to an air purifying device or respirable gas source, or both. It may be a facepiece, helmet, hood, suit or mouthpiece/nose clamp.

**Self-contained breathing apparatus (SCBA)** is an atmosphere supplying respirator in which the respirable gas source is designed to be carried by the wearer.

**Service life** is the period of time that a respirator provides adequate protection to the wearer.

**Sorbent** is a material which is contained in a cartridge or canister and removes

specific gases and vapors from the inhaled air.

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

**Tight fitting facepiece** is a respiratory inlet covering that is designed to form a complete seal with the face.

**Time-weighted average (TWA)** is the average concentration of a contaminant in air during a specific time period.

**Vapor** is the gaseous phase of matter which normally exists in a liquid or solid state at room temperature.

## 5. PROGRAM REQUIREMENTS

UT Tyler requires that a standard operating procedure be written to govern the selection and use of respirators based on the hazards to which the worker is exposed. The respirator should provide adequate protection and the user must be physically able to wear the respirator and properly trained in its selection, use, and maintenance. The University of Texas at Tyler Respiratory Protection Program covers the following elements.

A written plan explaining how the respiratory protection program will be administered.

A complete assessment of potential respiratory hazards that may be encountered in the workplace.

Procedures and equipment to control respiratory hazards, including the use of engineering controls and work practices designed to limit or reduce employee exposure to such hazards.

Guidelines for the proper selection of NIOSH approved respiratory protective equipment.

Employee medical evaluation and fit testing procedures.

Employee training which will include; limitations of air purifying respirators, hazard recognition, dangers associated with respiratory hazards, proper use, care, and storage of respiratory protective equipment.

Inspection, cleaning, and repair of respiratory equipment.

Evaluation of respirator program.

#### **A. Program Administration**

The Director of Environmental Health and Safety is responsible for developing and administering the Respiratory Protection Program and ensuring University employees comply with all aspects of this program. Contracted employment companies must follow federal and state guidelines regarding respirator usage.

- (1) EH&S is responsible for defining jobs that may require respiratory protection and the type of respirator needed to do the job safely. A Respiratory Hazard Assessment form will be completed. Written worksite-specific procedures shall be used to specify the type of respirator required for the task. Examples of worksite-specific procedures include standard operating procedures, safe work permits, Job Hazard Analysis (provided by EH&S), and warning signs.
- (2) Employees must not be assigned tasks requiring the use of a respirator unless they have been medically cleared by physician or other licensed healthcare professional, completed fit testing, and received training and instruction on the proper use and care of the respirator.
- (3) Respirators and equipment accessories shall be provided to all employees who require them for their assigned work when exposed to a known contaminant above the Permissible Exposure Limit (PEL). It is preferable that respirators are assigned to workers for their exclusive use.
- (4) Respirators will be selected on the basis of hazards to which the person is exposed with consideration given to both safety and health factors, as well as to probable risks during routine operations and emergencies. Only NIOSH approved respirators and accessories will be procured.
- (5) Before initial use, each respirator must be properly fitted, leakage tests performed, and the facepiece-to-face seal tested in a realistic test situation. Before each use, both positive and negative pressure tests shall also be conducted.
- (6) Workers shall be instructed and trained in the selection, use, care, and maintenance of respiratory protective equipment. Training shall provide each user an opportunity to handle the respirator, to have it fitted properly, to test its facepiece-to-face seal, to wear it in normal air for a familiarization period, and to wear it in a realistic test atmosphere. Retraining shall be done as needed to maintain an effective program.
- (7) Supervisors should conduct regular inspections to determine the continued effectiveness of the program. Similarly, EH&S will periodically evaluate the program and provide appropriate guidance.

#### **B. Hazard Assessment**

Departments should contact EH&S to request a risk assessment of their work environment if there is a potential respiratory hazard. EH&S shall determine the need



for respiratory protection with guidance of the OSHA Respiratory Protection Standard.

- (1) The hazard assessment will be based on: 1) the oxygen content of the atmosphere and 2) identification, toxicity, warning properties, actual or estimated airborne concentration and nature of the contaminant.
- (2) After evaluating the worksite hazard(s), EH&S will determine the need for respiratory protection and coordinate the training and fit testing if warranted.
- (3) If it is determined that an employee needs a respirator, one will be procured by the university at no cost to the employee.
- (4) It is the responsibility of the supervisor to ensure that employees who work in a hazardous environment wear proper respiratory protection before they are assigned the task.

#### **C. Medical Evaluation**

According to OSHA, any individual assigned to a task that requires the use of respiratory protection should be physically able to wear a respirator. The standard also requires that a physician or other licensed healthcare professional determine the employee's physical and physiological ability to perform their work while wearing the prescribed respiratory protection.

- (1) The medical evaluation will be coordinated by EH&S and should be conducted prior to any respirator fit testing and at no cost to the employee.
- (2) Employees will complete the Respirator Medical Evaluation Questionnaire as a part of the medical evaluation. The form will be part of the medical record and is confidential. Employees refusing to undergo a medical evaluation cannot be fit tested.
- (3) The examining physician will provide written opinion indicating the ability of the employee to wear the prescribed respirator and recommendations on limited respirator use, if any.

#### **D. Respirator Selection**

The guidelines outlined in this section provide assistance in the selection of appropriate respiratory protection. It is important that the supervisor assess the potential hazards and degree of control which can be exercised over each situation and require employees to use respiratory protective devices to protect their health.

- (1) The degree of respiratory hazard, as it refers to the selection and classification of respirators, depends upon several things, such as the atmospheric oxygen concentration; a contaminant's physical state, toxicity, and concentration; the presence of other contaminants or stress factors in the working environment; and

worker exposure time and susceptibility. Respiratory hazards may be classified as gas and vapor contaminants (immediately or not immediately dangerous to life or health), and oxygen deficiencies. Each classification requires a different type of respiratory protection.

- (2) In the selection and use of respiratory protective devices, various health and safety factors must be considered. For example, the characteristics of hazardous operation or process, the intended use and limitations of respiratory protective devices, the activity of workers in the hazardous area, the movement and work rate limitations, the lower flammability limits, protection factor, etc., must be taken into consideration while selecting respirators.
- (3) Factors used to select the appropriate respirators cartridges are sorbet efficiencies, poor warning properties, skin absorption, eye irritation, and conditions immediately dangerous to life or health (IDLH). Reference materials are available to assist in determining the general conditions or situations indicating the most appropriate use of respiratory protective devices, i.e. NIOSH Respirator Decision Logic.

#### E. **Respirator Use Under Special Conditions:**

The following are special situations, which may be encountered while wearing respiratory protective equipment.

- (1) *Facial Hair:* Facial hair that lies along the sealing area of the respirator, such as beards, sideburns, mustaches, or even a few days growth of stubble, will not be permitted on employees who are required to wear respirators. Facial hair between the wearer's skin and the sealing surfaces of the respirator will prevent a good seal.
- (2) *Eyeglasses:* Ordinary eyeglasses should not be used with full-facepiece respirators. Eyeglasses with temple bars or straps that pass between the sealing surface of a full-facepiece and the worker's face will prevent a good seal. Special spectacle kits can be ordered and mounted inside a full-facepiece respirator through the employee's supervisor.

Eyeglasses or goggles may interfere with the half facepieces. When interferences occur, a full-facepiece with special corrective lenses may be necessary.

- (3) *Contact Lenses:* Several factors may restrict or even prohibit the use of contact lenses while wearing any type of respiratory device. This is especially true of atmosphere-supplying respirators. With full-facepieces, incoming air directed toward the eye can cause discomfort from dirt, lint, or other debris lodging between the contact lens and the pupil.

Contact lenses should not be worn in hazardous environments without consultation with EH&S. Instead, the appropriate form of eye protection should be donned. This

may come in the form of goggles or safety glasses.

- (4) *Communication*: Verbal communication while wearing respiratory protection can be very difficult and may also contribute to a poor respirator seal. Therefore, hand signals may be an easier alternative. The hand signals should be worked out with the person you are working with prior to entry into a hazardous environment.
- (5) *Temperature Extremes*: Low temperatures may cause respirator lenses to become fogged. Coating the inner surface of the lens with the anti-fogging compound should prevent this problem. Full-facepieces with nose cups that direct warm, exhaled air through the exhalation valve without it's touching the lens are available. At very low temperatures, exhalation valves may freeze due to moisture.
- (6) *Physiological Response to Respirator Use*: Wearing any respirator, alone or in conjunction with other types of protective equipment, will impose some physiological stress on the wearer. Weight of the equipment, for example, increases the energy requirement for a given task. Selection of respiratory protective devices should be based on the breathing resistance, weight of the respirator, the type and amount of protection needed as well as the individual's tolerance of the given device.

Use of respirators in conjunction with personal protective equipment (PPE) can greatly affect the human response and endurance, especially in hot environments. Normally, in hot environments or during heavy work, the body relies a great deal on heat loss through the evaporation of sweat. With impermeable clothing, the heat loss due to water evaporation is not possible. Additionally, the weight of the respirator adds to the metabolic rate of workers, increasing the amount of heat the body produces. The net effect is one of heat stress.

When employees are wearing PPE the implementation of a work rest regimen should be implemented. This time spent working as opposed the time spent resting will be contingent upon the PPE being worn, temperature conditions, and physical demand of the work.

#### **F. Voluntary Use of Respirators**

Under certain circumstances OSHA allows voluntary use of filtering facepiece respirators, commonly referred to as a dust mask. Only NIOSH approved filtering facepieces should be used. Voluntary users of filtering facepieces are not required to undergo fit testing. It will be the employee's supervisor's responsibility to inform EH&S of any voluntary respirator usage prior to use.

Voluntarily users must ensure that they are not jeopardizing their health by wearing the respirator, it is clean, and it is not shared. Consultation with EH&S is recommended.

## 6. TRAINING

- A. **Initial Training:** The reasons for the use of respirators and the instructions on proper use and maintenance must be thoroughly understood to ensure employees properly employ the devices. A well-established training program is an essential component of a respiratory protection program and EH&S will coordinate the training. All employees whose work requires the use of respirators must attend training which will include:
- (1) Instructions in the nature of hazards and possible results of not using a respirator.
  - (2) Discussion on engineering and administrative controls.
  - (3) Recognition of emergency situations and methods of dealing with them.
  - (4) Discussion of why a certain type of respirator is used in a particular environment; also, description of types of respirators, their capabilities, and limitations.
  - (5) Proper selection, use, cleaning, and maintenance of respirators.
- B. **Annual Training:** All employees using respirators will be retrained and fit tested annually.

## 7. FIT TESTING

- A. All fit-testing will be coordinated by EH&S.
- B. Each user must be fit-tested before initial use and at least annually thereafter.
- C. The test will be performed using the respirator determined to be the most effective during fit-test for a particular individual.
- D. Prior to the selection process, the test subject will be shown how to put on a respirator, how to adjust strap tension, and how to assess a "comfortable" respirator.
- E. A qualitative fit-testing procedure to determine satisfactory facial seal with negative pressure respirators, as described in Appendix A.
- F. After passing the fit-test, the test subject will again be questioned about the comfort of the respirator. If it is uncomfortable, another model will be tried.
- G. An employee may use only that make and model respirator for which a satisfactory fit was completed. Under no circumstances may an employee use a respirator if the qualitative fit-testing indicates an unsatisfactory fit.

- H. Facial hair, scars, hollow temples, protruding cheek bones, absence of teeth or dentures, etc. may result in unsatisfactory fit. Employee must inform their supervisor of any such change.

## **8. MAINTENANCE AND STORAGE**

### **A. Maintenance**

- (1) The supervisor shall ensure that all respirators are properly maintained. If they are modified in any way, their protection factors may be reduced. The plan should include inspection, cleaning and sanitizing, repair and storage.
- (2) Each respirator must be cleaned and sanitized after each use as prescribed in Appendix B. The respirator shall be inspected after cleaning to determine any defects or if it needs any replacement of parts or repair.
- (3) Only a qualified person with proper tools and replacement parts should repair respirators. Attempts to replace components or to make adjustments or repairs beyond the manufacturer's recommendations should not be done.
- (4) A record of inspection dates, findings, and repairs should be maintained.

### **B. Storage**

- (1) Manufacturer's storage instructions are usually furnished with new respirators, and they should be followed.
- (2) After a respirator has been inspected and cleaned, it should be stored so as to protect against dust, light, damaging chemicals, and temperature extremes.
- (3) Each unit shall be sealed in a plastic bag and placed in a separate box. It should not be hung or pressed against walls.
- (4) Cartridges must be stored, with their original seals intact, in their sealed plastic bag until ready for use.

### **C. Inspections**

Emergency use respirators will be inspected monthly using the Respirator Inspection Checklist (see Appendix C) and the record shall be kept until the next certification is completed. The inspection record shall specify the inspection date, name of inspector, findings, remedial action and a means to identify the respirator.

## **9. RECORD KEEPING**

- A. EH&S will maintain training records until the next annual training is administered.
- B. EH&S will maintain the respirator fit testing records until the next annual test is administered. These records should include:

- (1) name of test subject;
- (2) date of fit test;
- (3) name and type of face piece satisfactory to test subject;
- (4) challenge agent used; and
- (5) certificate from the licensed health care professional stating that the subject is physically able to use respirator.

- C. Supervisor will maintain the records of inspection and maintenance of respirator.
- D. Medical records will be maintained the duration of employment plus 30 years.
- E. Records will be made available to the employee upon written request.

## **10. PROGRAM EVALUATION**

Wearing PPE of any type can cause undue stress on the individual wearing it. Therefore, engineering controls must be explored along with any other means to reduce employee exposure before utilizing PPE. If respirators must be used, supervisors through regular inspections and evaluations should determine the effectiveness of the respiratory protection program. EH&S will assess the need for respiratory protection along with any changes (upgrade or downgrade) to the program.

## **11. PROGRAM RESPONSIBILITIES**

### **A. Environmental Health and Safety**

- (1) Establish a University written Respiratory Protection program.
- (2) Evaluate respiratory hazards in the workplace and conduct periodic surveillance.
- (3) Provide guidance on appropriate respiratory protective equipment.
- (4) Facilitate instruction on proper use, maintenance, and storage of respirator equipment.
- (5) Facilitate fit testing and medical evaluations for all respirator users.
- (6) Maintain fit-testing and training records.
- (7) Evaluate overall effectiveness of the program and issue guidelines and updates.

**B. Department/Supervisor**

- (1) Ensure compliance with this Respiratory Protection program guidelines.
- (2) Coordinate a risk assessment of work site and need determination for respiratory protection.
- (3) Arrange for the medical evaluation of potential respirator users.
- (4) Purchase only NIOSH approved respirators and associated equipment.
- (5) Coordinate employee training and fit testing with EH&S.
- (6) Assume responsibility and/or appoint a respirator use coordinator within the department.
- (7) Ensure the availability of sufficient quantities of filters/chemical cartridges for specific contaminants and work activities and cleaning agents.
- (8) Periodically evaluate effectiveness of the program to ensure that personnel are fit tested, using proper respirators for the task, and the respirators are properly cleaned and maintained.
- (9) Notify EH&S if problems or deficiencies are observed.

**C. Employees**

- (1) Follow guidelines of this Respiratory Protection program.
- (2) Comply with fit test requirements.
- (3) Notify EH&S and health provider of any change in physical condition.
- (4) Clean, disinfect, and properly store the respirator.
- (5) Guard against damage to respirators during use, cleaning or storage.
- (6) Inspect the respirator for defects, missing parts, etc., and notify supervisor of requirements.



# APPENDIX A

## RESPIRATORY PROTECTION PROGRAM Qualitative Respirator Fit-Testing Protocol

### 1. Requirements

Before any kind of fit-testing is done, each test subject must have written approval from a Physician or other licensed healthcare professional attesting that the individual is physically able to wear a respirator.

### 2. Procedures

Irritant smoke can be used for both types of respirators. Air-purifying respirators should be tested with a commercially available smoke tube normally used to check the performance of a ventilation system.

Adequate ventilation should be provided when carrying out tests to prevent contamination of the room; or they should be conducted in a room that is not used for selection and fitting. The test subject must keep his/her eyes closed during the test.

The following procedure for fit-testing should be followed:

#### a. Respirator Selection

- (1) Only NIOSH approved respirators should be recommended for use.
- (2) Test subject should be allowed to select the respirator that is most comfortable.
- (3) Preferably, the fitting process should be conducted in a room separate from the fit test room to prevent contamination of the room. Prior to the selection, the test subject should be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension, and how to assess "comfort".
- (4) Assessment of comfort will include reviewing the following points with the test subject:
  - Proper chin placement
  - Positioning of mask on nose
  - Strap tension
  - Fitting across nose bridge
  - Room for safety glasses



- Distance from nose to chin
- Room to talk
- Tendency to slip
- Cheeks filled out
- Self-observation in mirror
- Adequate time for assessment

(5) The test subject will conduct the conventional positive-and negative-pressure fit cheeks (e.g. see ANSI Z88.2-1992), as described below. Before conducting these cheeks, the subject will be told to seat the mask by rapidly moving the head side-to-side and up and down, taking a few deep breaths.

(6) At this time, the test subject is ready for fit-testing.

(7) After passing the fit-test, the test subject will be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model should be tried.

#### b. Negative Pressure Test

The test subject should conduct this test after the selection of a comfortable respirator. It consists of closing off the inlet of the canister, cartridge, or filter (by covering with the palms or replacing the seals, or by squeezing the breathing tube so that air does not go through), then inhaling gently so that the facepiece collages slightly, and holding the breath for ten seconds. If the facepiece remains slightly collapsed and no leakage is detected, the respirator is considered tight enough. This test can be used only on respirators with tight-fitting facepieces.

#### c. Positive Pressure Test

Very much like the negative pressure test, this test is conducted by closing off the exhalation valve and exhaling gently into the facepiece. The fit is considered satisfactory if slight positive pressure can be build up inside the facepiece without any evidence of outward leakage. The test has some limitations depending on the type of respirator selected, which should be considered before making the test.

#### d. Fit-Testing

(1) Each respirator used for fitting and fit-testing will be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges will be changed at least weekly.

(2) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit-testing room.

(3) Each test subject will wear the respirator for at least ten minutes before starting

the fit-test.

(4) The test subject should perform the following exercises for about one minute:

- Normal breathing
- Deep breathing
- Turning head from side-to-side, taking care that the movement is complete, the respirator is not bumped on the shoulders, and inhalation is done at either side.
- Nodding head up and down, with complete motions at a frequency of one per second and making sure that the respirator remains tight.
- Talking. Talk aloud and slowly for several minutes.
- Normal breathing.

(5) If the irritant smoke causes the test subject to cough, the test should be stopped, the respirator rejected, and another one selected.

(6) Each test subject who passes the smoke test without evidence of a response is given a sensitivity check of the smoke from the same tube to determine whether the subject reacts to the smoke. Failure to evoke a response voids the fit-test.



# APPENDIX B

## RESPIRATORY PROTECTION PROGRAM

### Cleaning and Sanitizing Respirators

The following procedures are recommended for cleaning and sanitizing respirators unless specified differently by the manufacturer.

1. When necessary, remove the following components of respirators-inlet covering assemblies before cleaning and sanitizing.
  - a. Filter, cartridge, canisters;
  - b. Speaking diaphragms;
  - c. Demand and pressure demand valves assemblies; and
  - d. Any components recommended by the respirator manufacturer.
  
2. Cleaning Procedures
  - a. Wash respirator in warm water with a mild soap solution using a sponge or cloth. A soft bristle brush may be used to facilitate removal of dirt or other foreign material.
  - b. Rinse respiratory inlet covering assemblies in clean, warm water.
  - c. Drain all water and air-dry the respiratory-inlet covering assemblies.
  - d. Clean and sanitize all parts removed from respiratory-inlet covering as recommended by the manufacturer.
  - e. Hand-wipe respiratory-inlet covering assemblies, all parts, and all gaskets and surfaces with damp lint-free clothe as needed to remove water residue and all foreign materials and let air dry.
  - f. Inspect parts and replace any, which are defective.
  - g. Reassemble parts on respiratory-inlet covering assemblies.
  - h. Attach new filters, cartridges, and canisters to respiratory-inlet covering.
  - i. Visually inspect and, where possible, test parts and respirator assemblies for proper function
  - j. Place assembled respirators in appropriate containers for storage.

### 3. Sanitizing Procedures

Ultrasonic cleaners and dishwashers have been successfully used for cleaning and drying respirators. Exposure to temperatures above those recommended by the manufacturer (normally 490C or 1200F maximum) is likely to damage the respirator. Cleaner sanitizers that effectively clean the respirator and contain a bactericidal agent are commercially available. The bactericidal agent frequently used is a quaternary ammonium compound.

Strong cleaning and sanitizing agents and many solvents can damage rubber or elastomeric respirator parts. These materials must be used with caution. Alternatively, respirators may be washed in a detergent solution and then sanitized by immersion in sanitizing solution. Some solutions, which have proven effective, are:

- a. Hypochlorite solution (50ppm chlorine), two-minute immersion
- b. Aqueous iodine solution (50ppm iodine), two-minute immersion
- c. Quaternary ammonium solution (200ppm of quaternary ammonium compounds in water with less than 500ppm total hardness), two-minute immersion

Different concentrations of quaternary ammonium salts may be required based on water hardness to develop a proper sanitizing solution. Inflammation of the user's skin may occur if the quaternary ammonium compounds are not completely rinsed from the respirator. The hypochlorite and iodine solutions are unstable and break down as time progresses; they may cause deterioration of rubber or elastic and may be corrosive to metallic parts. Immersion times should not be extended beyond the recommended time periods, and the sanitizers must be thoroughly rinsed from the respirator parts.

### 4. Decontamination Procedures

Respirators may become contaminated with toxic materials. If the contamination is light, normal cleaning procedures should provide satisfactory decontamination; otherwise separate decontamination steps may be required before cleaning. Follow manufacturer's recommendations.

# APPENDIX C

## RESPIRATORY PROTECTION PROGRAM

### Respirator Inspection Checklist

<b>Respirator Issued to:</b>		<b>Type of Respirator:</b>	
<b>Location:</b>		<b>Type of Hazard:</b>	
Face piece	<input type="checkbox"/>	Cracks, tears, or holes	<input type="checkbox"/>
	<input type="checkbox"/>	Face piece distortion	<input type="checkbox"/>
	<input type="checkbox"/>	Cracked, scratched, or loose lenses/face shield	<input type="checkbox"/>
Head straps	<input type="checkbox"/>	Breaks or tears	<input type="checkbox"/>
	<input type="checkbox"/>	Loss of elasticity	<input type="checkbox"/>
	<input type="checkbox"/>	Broken buckles or attachments	<input type="checkbox"/>
	<input type="checkbox"/>	Worn serrations on head harness	<input type="checkbox"/>
Valves	<input type="checkbox"/>	Dust particles, dirt or residue on valve seat	<input type="checkbox"/>
	<input type="checkbox"/>	Cracks, tears or distortion in valve material	<input type="checkbox"/>
	<input type="checkbox"/>	Missing or defective valve covers	<input type="checkbox"/>
Filters/Cartridges	<input type="checkbox"/>	Proper filter/cartridge for hazard	<input type="checkbox"/>
	<input type="checkbox"/>	Approval designation	<input type="checkbox"/>
	<input type="checkbox"/>	Missing or worn gaskets	<input type="checkbox"/>
	<input type="checkbox"/>	Worn threads on filter	<input type="checkbox"/>
	<input type="checkbox"/>	Cracks or dents in housing	<input type="checkbox"/>
	<input type="checkbox"/>	Deterioration of canister "service life" indicator	<input type="checkbox"/>
Air Supply Systems	<input type="checkbox"/>	Breathing air quality/grade	<input type="checkbox"/>
	<input type="checkbox"/>	Condition of supply hoses and fittings	<input type="checkbox"/>
	<input type="checkbox"/>	Hose connections	<input type="checkbox"/>
	<input type="checkbox"/>	Settings of regulators and valves	<input type="checkbox"/>
Disposable Respirators	<input type="checkbox"/>	Holes in filter	<input type="checkbox"/>
	<input type="checkbox"/>	Elasticity of straps	<input type="checkbox"/>
	<input type="checkbox"/>	Deterioration of straps or metal nose clip	<input type="checkbox"/>

**10. Revisions**

<b>Date</b>	<b>Author/Reviewer</b>	<b>Description/Reason for Change</b>
5/31/2022	T Bay/ P Tate	Updated policy to reflect departmental changes
7/7/2023	T Bay/ K Stapp	Reviewed, updated logos and date