

Section 3. Respiratory Protection Plan

The objective of this plan is to familiarize supervisors and employees with the equipment, training and other pertinent information required in the prevention of respiratory exposure to hazardous substances. The application of pesticides is the principle activity at the TFREC requiring respiratory protection. However, any other work process exposing employees to hazardous substances in concentrations exceeding the Permissible Exposure Limit (PEL) requires the proper use of respiratory protection.

The following requirements must be met before an employee uses a respirator in the workplace.

1. A respirator medical evaluation must be performed by a personal licensed health care professional (PLHCP).
2. A hazard assessment for each respiratory hazard must be completed by an industrial hygienist in the Environmental Health and Safety (EH&S) department.
3. The employee must be trained in the following areas: hazard communication, respiratory hazards, proper respirator use, end of service life indicators (ESLI), user seal check procedures, respirator inspection, cleaning, storage and repair.
4. The employee must select a comfortable respirator.
5. A fit test must be performed by a qualified EH&S person if a tight-fitting air purifying respirator is used.

The following information is provided to clarify the above requirements.

1. Medical evaluation
Each employee wearing a respirator in the workplace must complete a WISHA respirator medical evaluation questionnaire. The information on this questionnaire is confidential and must not be reviewed by supervisors or employers. An employee may not wear a respirator in the workplace until their PLHCP has evaluated the information on the questionnaire and given written approval for the employee to wear a respirator.
2. Respiratory hazard assessment
Determination of types of respirators and cartridges to be used by TFREC employees is made by personnel classified as industrial hygienists in the EH&S department; further, such determination is made only by staff who have been trained and certified according to the provisions of the WSU EH&S Respiratory Protection Program. These persons are referred to as qualified respiratory hazard assessors (QRHA). A QRHA will review the task, the contaminants related to the task, the properties of the contaminants, and other pertinent information to determine the appropriate respirator type and air purifying elements needed, if applicable.
3. Respirator selection
Upon completion of the respiratory hazard assessment process, and the corresponding selection of the appropriate type of respirator, the employee will be allowed to select the

most comfortable respirator from a variety of sizes and models. The employee should wear the respirator for a minimum of five minutes to assess comfort. During the selection process, the employee should be shown how to properly don the respirator, how it should be positioned on the face and how to set strap tension. At the TFREC, Air Purifying Respirators (APRs) are used for most applications. APRs are divided into two groups, positive and negative pressure. APRs may be worn under the following conditions:

- Sufficient oxygen is present (the atmosphere must contain more than 19.5% oxygen).
- The contaminant is known.
- Air contaminants are below levels that are immediately dangerous to life and health (IDLH). If the atmosphere is not IDLH, air purifying elements may be used as follows:
 - a. Organic vapor up to 1,000 ppm.
 - b. Sulfur dioxide up to 50 ppm.
 - c. Chlorine up to 10 ppm.
 - d. Hydrochloric acid up to 50 ppm.
 - e. Ammonia up to 300 ppm.
 - f. Methylamine up to 100 ppm.
- Gases and vapors have adequate warning properties. Chemicals with poor warning properties are defined as those whose permissible exposure limit or threshold limit value is greater than their Geometric Mean Odor Threshold.
- No asphyxiates are present.
- No facial hair or stubble is present in the area of the respirator seal.
- Respirators must be NIOSH/MSHA/DHHS approved.
- A fit test is performed on all tight-fitting respirators.
- The appropriate cartridge is selected.

If the contaminants or their concentrations are not known the atmosphere must be considered IDLH, and a Self-Contained Breathing Apparatus (SCBA) must be worn.

Note: Air purifying elements are not approved for use with the following chemicals:

Acrolein	Hydrogen Cyanide	Nitrogen Oxides
Aniline	Hydrogen Fluoride	Nitroglycerin
Arsine	Hydrogen Sulfide	Nitromethane
Bromine	Methylamine	Ozone
Carbon Monoxide	Methyl Iodide	Phosgene
Chloropropane	Methanol	Phosphorus Trichloride
Dichloromethane	Methyl Bromide	Sulfur Chloride
Dichloroethane	Methyl Chloride	TDI
Dimethylaniline	MDI	Vinyl Chloride
Dimethylsulfate	Nickel Carbonyl	
Ethyl Chloride	Nitrobenzene	

4. Fit test

A fit test must be performed and passed before an employee wears a tight-fitting respirator. If an employee wears more than one model or size respirator, a separate fit test must be conducted for each respirator. The fit test will be conducted by an authorized EH&S employee.

5. Change schedule for cartridges and filters

Another consideration in the proper use of air purifying elements is their service life. It is, therefore, important for a qualified respiratory hazard assessor to use available federal or state standards in determining service life of cartridges used on APRs.

- If an air-purifying cartridge is used, and the cartridge contains an End-of-Service-Life-Indicator (ESLI), the employee will change the cartridge when the ESLI indicates the cartridge media is saturated.
 - If the manufacturer presents a schedule for changeout of air-purifying cartridges, the employee wearing the respirator equipped with those cartridges shall follow the manufacturer's requirements.
- a. The North "esLife" Respiratory selection guide is shared on the EH&S network server.
 - b. The 3M homepage for Occupational health and environmental safety products allows a person to download their updated ESLI program. This can be accessed at www.mmm.com/market/safety/ohes2/index.html
 - c. The MSA homepage for respirator cartridge change can be accessed at www.msanet.com/safetyproducts/resptest/index.html
 - d. Information from other manufacturers may be accessed through the WSU Respiratory Program Administrator.
 - e. If manufacturer changeout schedules are not available, the OSHA Respiratory Protection Advisor homepage featuring the Wood Math model should be consulted. It can be accessed at www.oshaslc.gov/SLTC/respiratory_advisor/mainpage.html
 - f. If neither manufacturer information nor regulatory standards/information are available, contact an EH&S representative.
- For pesticide use, EH&S recommends an organic vapor cartridge combined with a P, R, or N series filter. A eight hour service life for pesticides with good warning properties is recommended for pesticides.
 - Air purifying cartridges shall not be used on any air purifying respirator, for any contaminant, for more than 16 hours of exposure.
 - If air purifying filter elements are used on the respirator, they shall be changed as follows:
 - a. P-series filters or HEPA filters shall be replaced whenever they are damaged, soiled, or cause noticeable increased breathing resistance.
 - b. N-series filters, under conditions in which the filter will be loaded to 200mg or less, shall be replaced weekly (40 hours service), or whenever they are damaged, soiled, or cause

noticeable breathing resistance. If filters loading is greater than 200mg, filters must be changed at least daily (8 hours service).

- If “stacked” cartridges are used on an air purifying respirator, the change schedule must conform to the cartridge or filter element which must be changed most frequently.
- Air purifying elements used in the presence of organic vapors with a boiling point that is less than 65°C should be changed after each work shift even if the service life indicates that the cartridge is not saturated. The vapors will migrate through the cartridge matrix during the time the cartridge is not used, saturating the matrix, and will, therefore, render the cartridge incapable of providing respiratory protection.

6. Employee Training

Employees using respirators in the workplace must receive annual training in respiratory protection and hazard communication. Employees must also receive training if changes in the workplace or the type of respirator render previous training obsolete, inadequacies in the employee’s knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill, any other situation arises in which retraining appears necessary to ensure safe respirator use.

A QRHA will provide training for each employee based on the information provided on the Respirator Authorization form.

Training shall include:

- a. The reasons for respiratory protection.
- b. The effects of improper fit, usage, or maintenance of the respirator.
- c. The nature, extent, and effects of respiratory hazards.
- d. The application, presence, and adequacy of engineering controls.
- e. The effort made by the employer to reduce or eliminate the need for respirators.
- f. The use of a specific type of respirator to control a specific type of hazard.
- g. The operation, capabilities and limitation of the respirator chosen.
- h. Inspection and checking the fit of the respirator.
- i. Respirator fit considerations, including facial hair, scars, weight loss or gain, dentures, glasses, other PPE or any other conditions interfering with the face seal.
- j. Handling, wearing and donning the respirator in a safe environment and a test environment.
- k. Cleaning, sanitizing, maintenance, storage and repair of the respirator.
- l. Recognizing and coping with emergency situations.
- m. Leaving a hazardous area due to respiratory protection problems.
- n. Medical signs and symptoms that may limit or prevent the effective use of respirators.
- o. Regulations concerning respirator use.
- p. Recurrent testing and training requirements.

Records of training must be maintained for thirty years.

7. User seal check procedures

Any WSU employee using a tight-fitting respirator facepiece is to perform user seal checks to ensure that an adequate seal is achieved each time the respirator is put on.

Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal.

Negative pressure check. Close off the inlet opening of the cartridge(s) by covering with the palm of the hand(s) or by replacing the cartridge seal(s). Inhale gently so that the facepiece collapses slightly and hold the breath for ten seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

8. Respirator Cleaning and disinfecting procedure

- Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition.
- Respirators issued to more than one employee shall be cleaned and disinfected before each use
- Before cleaning the respirator, remove cartridges, filters, speaking diaphragms and valve assemblies.
- Wash components in warm (110°F maximum) water with a mild detergent or other cleaner suggested by the manufacturer. A stiff bristle brush may be used to facilitate cleaning.
- Rinse all components in clean, running water.
- Drain all components.
- When the cleaner does not contain a disinfecting agent, the respirator components should be immersed for two minutes in a solution made up of one milliliter of laundry bleach in one liter of water.
- Other commercially available cleaners may be used when recommended by the manufacturer.
- Rinse all components thoroughly.
- Components should be hand-dried with a clean cloth or air-dried.
- Reassemble all respirator components.
- Test the respirator to ensure that all components work properly.

9. Respirator storage procedure

- When a respirator is not in use, it should be placed in a clean storage bag.
- Store the respirator where it will not be compressed.
- Store the respirator away from contaminated work areas, dust, sunlight, extreme temperatures, excessive moisture, or damaging vapors.
- Cartridges should be stored separately from the respirator in a sealed bag in a place protected from chemicals, vapors or dust, water, or high humidity.

10. Respirator inspection

- Respirators should be inspected before each use and during cleaning.
- Ensure the respirator is clean and the rubber facepiece has no cracks, cuts, holes, UV deterioration, stiffness, or deformities.
- Ensure the inhalation and exhalation valves are in place and that the valves are pliable and flat, valve seats are not torn, the speaking diaphragm is in place, and clean.
- Straps and harness should not be twisted, should be flexible, adjustable and have proper elasticity.
- Cartridges should be discarded if they are contaminated, cracked, or if they have reached the end of service life.

11. Respirator repair

- a. Respirators that fail an inspection or are otherwise found to be defective should be removed from service and should be discarded or repaired according to procedures listed below.
- b. Repairs and or adjustments to negative pressure air purifying respirators shall be performed as follows:
 - All employees wearing negative pressure air purifying respirators are trained by the fit test operator to properly inspect the respirator and are, therefore, considered qualified to perform repairs/adjustments on their own respirator. The employee must first inform his/her supervisor of any problem with the respirator as soon as the problem is noticed. The supervisor is responsible to oversee the repair and to ensure the respirator is functioning properly before it is used in a hazardous atmosphere. The employee is encouraged to consult the EH&S fit test operator prior to making the repair/adjustment to confirm the repair is permitted under the requirements of NIOSH and/or the manufacturer of the respirator.
 - No employee may repair the respirator of another employee.
 - All repairs to powered air purifying respirators shall be performed by an EH&S fit-test operator.

12. Voluntary respirator use

- Employees working at the TFREC may request the use of a respirator for chemical exposures whose concentrations are below the permissible exposure limit, or for protection against exposure to chemical, biological, or radioactive materials which are unregulated for employee exposure. Use of respirators not required for employee protection is referred to as voluntary respirator use.
- The employee or the employer may provide voluntary use respirators. The TFREC is not required to provide respirators for voluntary use.
- The employee using a respirator on a voluntary basis must provide the EH&S fit test operator with a written statement from his/her physician indicating he/she is medically capable of wearing the respirator for the situation or task intended.
- The employee must be trained to clean, store and maintain the respirator so that its use does not present a health hazard.
- The employee's supervisor must be trained in cleaning, storage and maintenance requirements and must periodically inspect the area in which the employee uses the

respirator to determine a health hazard is not being presented to the employee by respirator use.

13. Respirator program evaluation

- The EH&S respirator program administrator (RPA) shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented.
- The RPA shall consult with employees to assess the employees' views on the effectiveness of the current program. Problems identified during this process shall be corrected as soon as reasonably possible, but at a minimum within one year of discovery.
- The RPA shall conduct periodic audits of respirator use. The audit shall be conducted without prior notification to departments.
- The respiratory protection program shall, at a minimum, be reviewed annually.