

Respiratory Protection

University of Tennessee Safety Program IH-003

Document Contact: EHS-General Safety

Date effective: January 1, 2006

Revision Date: March 1, 2014

Purpose

It shall be the policy of the University of Tennessee to prevent exposure to airborne hazards while on the job. A respirator is one means to provide protection when other controls are not available or are ineffective.

The primary objective is to prevent harmful exposure to airborne contaminants. Where feasible, this shall be accomplished through engineering controls (for example, enclosure or isolation, general or local ventilation, and substitution of less toxic materials). When effective engineering controls and/or administrative controls are not feasible, or while they are being instituted or evaluated, the use of appropriate respiratory protection will be required.

Scope and Applicability

This program shall apply to all respirators used by UT employees and students for the purposes of health protection. The program shall not apply to respiratory used for comfort or to prevent exposure to nuisance levels of air contaminants. The Respiratory Protection Manager is the Director of Environment, Health and Safety (EHS).

Abbreviations and Definitions

Air -Purifying Respirator (APR): a type of 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 respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied air respirators (SARs) and self-contained breathing apparatus (SCBA) units

Canister or Cartridge: a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air as it passes through the container.

EHS: Environmental Health and Safety

Employee Exposure: exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection

Filter: a component used in respirators to remove solid or liquid aerosols from the inspired air

Fit Test: a protocol to quantitatively or qualitatively evaluate the fit of a tight- fitting respirator on an individual.

Immediately dangerous to life or health (IDLH): an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a

dangerous atmosphere.

Loose Fitting Face piece: a respiratory inlet covering that is designed to form a partial seal with the face or head

MSDS: Material Safety Data Sheets (a, now, defunct term for safety data sheets)

NIOSH approval: the approval of a respirator for worker protection by the National Institute for Occupational Safety and Health (NIOSH).

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

Respiratory Inlet Cover: 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.

SDS: Safety Data Sheets – new name for MSDS

Self-Contained Breathing Apparatus (SCBA): an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

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, but it taken from a remote location.

Tight-fitting Face piece: a respiratory inlet covering that forms a complete seal with the face.

Roles and Responsibilities

Managers and Supervisors shall:

- Provide respirators that are suitable for the hazard when such equipment is necessary to protect the health of the individual,
- Make sure respirator users receive proper training, such as use (including putting on and removing) and any limitations of respirators,
- Ensure there is a convenient, clean and sanitary location to store respirators,
- Ensure respirator users complete necessary medical clearance to wear respirators,
- Ensure respiratory protection equipment is properly used, cleaned, stored and maintained,
- Maintain an inventory of spare filters and new respirators as necessary to insure employees and students have access to properly-functioning equipment
- Conduct annual worksite audits of respiratory protection activities under their control. Note EHS may assist with this effort.
- Allow employees to leave the respirator use area as necessary to prevent eye or skin irritation associated with respirator use;

Environment, Health and Safety (EHS) shall:

- Establish and maintain the Respiratory Protection Program,
- Provide consultation for respirator users,
- Present training and fit testing upon request prior to requiring the individual to use a respirator,
- Perform surveillance of work area conditions to ensure the program is properly implemented and

individuals are using respirators appropriately,

- Conduct an annual evaluation of program effectiveness,
- Assist departments with their respirator protection program needs, including site-specific written plans.
- Maintain selected records

UT employees and students who use respirators shall:

- Use provided respiratory protection in accordance with the instructions,
- Attend required training and fit testing,
- Immediately report any malfunction of the respirator to their supervisor or instructor,
- Notify their supervisor or instructor when a change in their health status occurs that could affect their ability to use a respirator.
- Comply with all required components of the UT Respiratory Protection Program (medical surveillance, training and fit-testing) **before** using any respirator.
- Use respiratory protection equipment as instructed and in accordance with all provisions of the UT Respiratory Protection Program and OSHA requirements,
- Properly store, clean, inspect and maintain all assigned respirator equipment,
- Inform supervisors or instructors of new situations that may require a change in the use of respiratory protection equipment, or if contaminant levels are suspected to increase,
- Report any respirator deficiencies or malfunctions to their supervisor or instructor,
- Use the correct type of respiratory protection for the hazard(s) involved,
- Immediately follow emergency procedures and leave the respirator use area if a respirator fails to provide proper protection.

Procedures

Medical Evaluation

- All employees will complete an OSHA Respirator Medical Evaluation Questionnaire before using a respirator. The questionnaire will be submitted to Student Health by EHS to be evaluated by a qualified person. Pass/Fail information will be entered with records kept by EHS.
- Pre-employment physical examinations will be conducted on all employees required to wear a negative-pressure respirator and who failed the initial medical evaluation questionnaire.
- Follow-up medical evaluations shall be provided, at no expense to the employee, when a change in the respirator user's health is noted. The respirator users, his or her supervisor or the respiratory protection program administrator may request the need for a follow-up medical evaluation.

Respirator Selection

The basic purpose of any respirator is to protect the user from specific inhalation hazards. Respirators provide protection by removing contaminants from the air before inhalation or by supplying an independent source of respirable air.

The Occupational Safety and Health Administration (OSHA) establishes assigned protection factors for different levels of respiratory protection. The following table indicates the various types of respirators available, and the maximum assigned protection factor assigned to each*:

<i>Respirator Type</i>	<i>Assigned Protection Factor</i>
Filtering Facepiece Respirators	10
Air-Purifying Half-Mask Respirators	10
Loose-Fitting Air-Purifying Respirators	25
Air-Purifying Full-Face Respirators	50
Tight Fitting Powered Air-Purifying Respirators (full-face)	1000
Air Line Respirators	1000
Self-Contained Breathing Apparatus (SCBA)	10,000

* The Assigned Protection Factors (APFs) shall comply with any changes to 29 CFR 1910.134(d)(3)(i)(A).

Maximum acceptable airborne levels for respirator users are determined by multiplying the Assigned Protection Factor by OSHA's Permissible Exposure Level.

Only NIOSH approved respirators will be used in this program.

The choice of respirators will be dependent upon the following information:

- The airborne contaminants and concentration present.
- The physical, chemical, and toxicological properties of the contaminants.
- Odor threshold data (warning properties).
- Applicable exposure limits.
- Eye irritation potential.
- Service life information available on cartridges or canisters.

Fitting of Respirators

Requirements for Fit Testing

- Fit testing shall occur annually.
- Fit tester training programs will be utilized and the appropriately trained individuals may be used for specific departmental fit testing.
- Additional fit testing may be required when a respirator user or other individual reports changes in the user's physical condition that could affect the respirator fit. These changes could include facial scarring, dental changes, cosmetic surgery, a significant change in body weight, etc.
- Fit testing must be conducted using an OSHA-accepted protocol.
- Individuals with facial hair that interferes with the seal of the respirator will be requested to remove the interfering facial hair or sign a waiver stating that they declined to be fit tested.
- Individuals who cannot be fitted with an approved respirator may use a loose-fitting PAPR if available and acceptable for the hazards present.

Single use respirators (example N-95)

- Single use respirators may be provided within limitations. Only tested and certified respirators shall be used.
- Single use respirators will be discarded at the end of each shift or more frequently based on a change schedule
- Visibly soiled or contaminated respirators will be discarded immediately after use.

Inspection, Cleaning, Repair and Storage

The following are key elements of a good respiratory protection program.

- Inspection – Respirators shall be inspected for defects (including a leak check) before and after each use. Visual inspection shall include a check of the tightness of connections and the condition of the face piece, headbands, valves, connecting tube, and cartridges or canisters. Rubber or elastomer parts shall be inspected for pliability and signs of deterioration.
- Cleaning and disinfecting. Respirators shall be cleaned and disinfected as frequently as necessary to ensure that proper protection is provided for the wearer.
- Repair or replace damaged part. Only factory authorized persons shall make repairs with parts from the manufacturer designed for the respirator
- Storage - Respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, theft, physical damage, or damaging chemicals. Cleaned respirators will be kept in a clean, plastic bag and in a designated location. When storing a respirator, the face piece and exhalation valve must be in a normal position to prevent the abnormal set of elastomer parts during storage.

Evaluation of Program Effectiveness

- Frequent unscheduled observation of activities throughout the facility will be conducted to confirm proper respirator use. This may be included as part of the periodic EHS building inspection program.
- Observations and discussion with new respirator users throughout the campus will be conducted to evaluate compliance.
- The overall effectiveness of the respirator program will be evaluated as necessary by the program administrator with actions taken to correct any defects found in the program.

Training and Information

- Each individual assigned to an area requiring the use of a respirator will be shown and instructed on how to use (including putting on and removing) the respirator properly.
- Each individual will be trained why the respirator is necessary and on its limitations.
- Employees required to wear respirators will be instructed to immediately leave a contaminated area upon suspicion of respirator failure.
- A record shall be maintained of training and fit testing.

Recordkeeping

<i>Record</i>	<i>Storage location</i>	<i>Minimum length of record retention</i>
Medical Evaluation	EHS	40 years
Air Monitoring Results	EHS	40 years
MSDS/SDS	EHS	40 years
Respirator Fit Testing (Including Brand and Size)	EHS	3 years
Employee Training	Department/Responsible Unit	3 years

Medical records shall be secured to control access.

References

29 CFR 1910.134 (OSHA)

Appendices

Appendix A: Volunteer Use Respirator Information

Appendix B: Tasks Requiring Use of Respirator Protection

Appendix C: Filter Element Replacement Schedule

The OSHA Respirator Medical Evaluation Questionnaire can be downloaded at the web-site below:

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9783

Disclaimer

The information provided in these guidelines is designed for educational use only and is not a substitute for specific training or experience.

The University of Tennessee Knoxville and the authors of these guidelines assume no liability for any individual's use of or reliance upon any material contained or referenced herein. The material contained in these guidelines may not be the most current.

This material may be freely distributed for nonprofit educational use. However, if included in publications, written or electronic, attributions must be made to the author. Commercial use of this material is prohibited without express written permission from the author.

Appendix A: Voluntary Use Respirator Information

Some UT employees and students may choose to use filtering face piece respirators, also referred to as N95 or N99 disposable dust masks, on a voluntary basis during activities that involve exposures to low-level, non-hazardous nuisance dust or other similar particulate. According to the Occupational Safety and Health Administration (OSHA) regulations, UT must provide you with the following information if you wear a filtering face piece respirator voluntarily. The following information is copied from the OSHA Respiratory Protection Standard and pertains to the voluntary use of respirators. After reading the information below, please complete the section at the end of this form.

29 CFR 1910.134, Appendix D – (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

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.

You should do the following:

1. Read and heed 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.

The filtering face piece respirator you have elected to use is approved, when fitted properly, for use against nuisance non-hazardous particulate (e.g., fiberglass, sheet rock dust, sawdust, dirt, pollen, animal dander). It will not provide protection from any chemical vapors such as those associated with spray paints or solvents. It is not intended for use during work that may involve exposure to airborne asbestos fibers, silica dust, or lead dust. Work you perform that may involve airborne asbestos fibers, silica dust, or lead dust should be reviewed by EHS before the project proceeds. If you have questions concerning any of this information, please contact EHS at 865-974-5084.

Please complete the form on next page

Please complete the section below:

Name (print):	Job Classification:
Department:	PI/Supervisor:
Location of use:	
Reason for using dust mask (describe nature of work, specific location, and type of dust):	
I have read and understood the information provided	
Signature:	Date:

Appendix C: Filter Element Replacement Schedule

The supervisor or instructor of each worksite where air-purifying respirators are used shall complete information below indicating filter element replacement schedules. These schedules must be specific to contaminant, respirator, task, and estimated worst-case environmental conditions. Note that some filter elements have an end-of-service indicator, which may be used to determine the replacement frequency. Contact EHS if you need assistance in this matter.

<i>Task/Respirator Equipment</i>	<i>Cartridge Change Schedule</i>	<i>Method of Determination</i>