Occupational Safety Program

Respiratory Protection Program
Manual

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Purpose

The purpose of the program is to maintain a safe and healthful environment for employees that may be exposed to respiratory hazards in their work area. The program establishes procedures for the selection, use, and care of respiratory protective devices. Administrators, faculty, staff, and students share the responsibility to ensure protection against inhalation hazards through the correct use of respiratory protective devices. The program will be used to identify procedures and designate responsibilities and it addresses the use of respiratory protection as a method to protect University employees from exposures to airborne biological, chemical, and physical agents to safe levels below regulatory exposure limits as well as from oxygen rich and deficient (<19.5% or >23.5% oxygen) environments.

Scope

This scope of the program includes respiratory protection that is required to be used by employees and voluntarily used by employees in instances where such protection is not required. Respirators shall only be used to protect employees from inhalation hazards in the following circumstances: (1) when other options for hazard control are infeasible (i.e., engineering controls or substitution of less toxic materials); (2) while engineering controls are being installed or repaired; or (3) during emergencies. Wherever feasible, engineering controls and work practices will be used to maintain worker exposures below regulatory exposure limits and at a safe level. When respirators are to be used, all requirements contained within the program shall be followed.

The program shall be reviewed and evaluated for its effectiveness at least annually and updated as necessary to incorporate new or modified regulations and guidelines that affect the proper use of respiratory protective devices. With respect to the program, a respirator shall be defined as any device worn to: (1) reduce or eliminate inhalation exposure to any hazardous biological, chemical, or particulate material, or (2) supply breathing air to the wearer. This includes respirators used to protect employees in an emergency.

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.

Assigned protection factor (APF): The workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section.

Atmosphere-supplying respirator: A respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge: A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator: An atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation: Any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

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

End-of-service-life indicator (ESLI): A system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator: A respirator intended to be used only for emergency exit.

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

Filtering facepiece (dust mask): A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

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 a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

Full-face respirator: A respirator that covers the whole face, including the eyes, nose, and mouth, with the facepiece sealed around the forehead, cheeks, and chin.

Half-face respirator (half-mask): A respirator that primarily covers the lower half of the face, including the nose and mouth, with the facepiece sealed around the nose, cheeks, and chin.

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 monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N-100, R-100, and P-100 filters.

Hood: A respiratory inlet covering that completely covers the head and neck and may also cover

portions of the shoulders and torso.

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

Interior structural firefighting: The physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR 1910.155)

Loose-fitting facepiece: A respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC): The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

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

Oxygen deficient atmosphere: An atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP): An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator: A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR): An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator: A positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT): A pass/fail fit test to assess the adequacy of respirator fit that relies

on the individual's response to the test agent.

Quantitative fit test (QNFT): An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering: That portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

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 facepiece: 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.

Responsibilities

A. Environmental Health & Safety (EHS)

1. EHS will appoint a program administrator for the program.
2. EHS will develop the program with annual review and revisions as necessary.
3. EHS will distribute the program to each affected worksite.
4. EHS will evaluate respiratory hazards in the workplace.
5. EHS will provide guidance and training to the campus community regarding the need, selection, use, limitations, maintenance, and storage of respirator equipment.
6. EHS will provide a respirator fit-testing program for respirator users.
7. EHS will maintain training and fit-testing records.
8. EHS will coordinate the University's respirator medical monitoring program with the contracted Medical Monitoring Facility (MMF).
9. EHS will assist with developing and implementing controls to reduce or eliminate the need for respiratory protection.
10. EHS will act as an information resource for problems and questions related to respiratory protection.

B. The Medical Monitoring Facility (MMF)

1. MMF is a facility that EHS contracts with to provide occupational medical monitoring.

2. MMF will provide or direct all required or recommended medical examinations appropriate for evaluation of respirator users.
3. MMF will maintain medical records relating to consultations, examinations, and medical surveillance as required by law.
4. MMF will provide certification that persons required to wear respirators are physically able to do so without adverse medical consequences.
5. MMF will periodically review the overall effectiveness of the program pertaining to provision of medical services related to the proper use of respirators.

C. Supervisors, Principal Investigators, and Directors (Supervisors)

1. Supervisors must know the hazards in their areas that require respiratory protection.
2. Supervisors will identify employees who may require respiratory protection equipment.
3. Supervisors will ensure that initial medical examinations, follow-up medical examinations, fit-testing, and training as described in the program are provided to employees required to wear respirators.
4. Supervisors will provide site-specific information in the program detailing personnel, hazards, and procedures.
5. Supervisors will ensure respiratory protection equipment is properly used, cleaned, stored, and maintained.
6. Supervisors will maintain an inventory of spare parts, filters, and new respirators as necessary to ensure employees access to properly functioning equipment.
7. Supervisors will ensure that defective respiratory protective equipment is removed from service immediately and not used until approved repairs are affected.
8. Supervisors will conduct periodic worksite audits of respiratory protection activities under their control.
9. Supervisors will allow employees to leave the respirator use area as necessary to prevent eye or skin irritation associated with respirator use.
10. Supervisors will ensure appropriately trained and equipped employees remain in communication with respirator users inside an IDLH atmosphere.
11. Supervisors will notify EHS of any problems with respirator use, or any changes in work processes that would impact airborne contaminant levels.
12. Supervisors will notify EHS of any change in an employee's medical condition, work environment, or workload that might impact the safe use of respiratory protective equipment.

D. Respirator Wearers/Employees

1. Employees will comply with all required components of the program (medical surveillance, training, and fit testing) before using any respirator.
2. Employees will use respiratory protection equipment as instructed and in accordance with all provisions of the program.
3. Employees will properly store, clean, inspect, and maintain all assigned respirator equipment.
4. Employees will report any respirator deficiencies or malfunctions to their Supervisor.

5. Employees will use the correct type of respiratory protection for the hazard(s) involved.
6. Employees will inform Supervisors of new situations that may require a change in the use of respiratory protection equipment.
7. Employees will inform Supervisors of any change in medical condition that might affect the safe use of respiratory protective equipment.
8. Employees will immediately follow emergency procedures and leave the respirator use area if a respirator fails to provide proper protection.

Introduction

Millions of workers are required to wear respirators in various workplaces throughout the United States. Respirators are among the most important types of personal protective equipment for work in a hazardous environment. Respirators protect workers against insufficient oxygen environments, harmful dusts, fogs, smokes, mists, gases, vapors, and sprays. These hazards may cause cancer, lung impairment, diseases, or death. Compliance with the OSHA Respiratory Protection Standard will decrease the likelihood of illness, injury, and death.

A respirator is a device that can protect the user from respiratory hazards, such as chemicals (including harmful vapors, gases, and fumes), infectious aerosols and related biological hazards, airborne radiological hazards, dusts of varying composition, and respirable particulate matter such as silica. Not all respirators provide the same level of protection or can protect against each hazard. Selecting the right respirator requires an assessment of all the workplace operations, processes, or environments that may create a respiratory hazard. The identity of the hazard and its airborne concentrations need to be determined before choosing a respirator. This assessment should be done by experienced safety personnel or by an industrial hygienist. There are several different types of respirators, as described below.

Respirators protect the user in two basic ways. The first method is by the removal of contaminants from the air, which defines an air-purifying respirator. Respirators of this type include particulate respirators (filtering facepieces), which filter out airborne particles; reusable respirators with cartridges/canisters, which filter out chemicals and gases (often known as gas masks); and powered air-purifying respirators (PAPRs), which use a fan to draw air through a filter, use cartridges, and are reusable. Respirators such as gas masks are typically composed of a reusable facepiece and straps, where the cartridges are disposable, while a PAPR will have a hood that covers the head, use disposable cartridges, and a hose attached to a wearable unit that powers the fan.

The other method involves protecting the user by supplying clean respirable air from another source, and so these devices are known as air-supplying respirators. Respirators that fall into this category include airline respirators, which use compressed air from a remote source, and self-contained breathing apparatus (SCBA), which include their own air supply (i.e. air-filled gas cylinder, typically strapped to the user's back linked to respirator and a regulator). Towson University currently does not supply airline respirators or SCBA. Employees and others will avoid continued occupancy in or entry into any environment that is oxygen deficient.

Masks vs. Respirators

Masks (including surgical masks for healthcare) are different from respirators, though they are worn similarly and provide some respiratory protection. These may be found in multiple settings, particularly in the post-pandemic (COVID-19) world, but they are often found together in healthcare settings. The terms mask and respirator have been used interchangeably, but they are different in both purpose and how they function. The style and parts of the equipment (ear loops and face covering for masks, as opposed to head straps, nose clip, and facepiece) may be observed to reflect a difference in requirements for use.

Masks are widely available, easier to make, relatively comfortable, catch user droplets/aerosols, but provide little protection to the user as masks are meant to protect the environment from the user. They do not need a tight fit to perform its function, and no fit test is required to wear them. As an example, surgical masks are useful in that they prevent contamination of sterile surfaces or patients during open surgery by blocking aerosols from the user's nose and mouth. Although masks are used to protect the environment from the user, during the pandemic, they were used to protect the user by requiring all individuals to wear them in public, effectively removing contaminated aerosols/droplets from the atmosphere in a given space.

Respirators have a different function in that they protect the user from the environment around them. The use of this equipment does not require that everyone wear them in order to be effective as the primary function is often to act as a filter. They typically either purify the air to the user by removing toxic or irritating particles or they supply air or oxygen to the user in an environment that contains such particles and is also an oxygen-deficient atmosphere. For this reason, a proper fit and seal is a requirement to wear a respirator, and a fit test is required to wear this equipment. There are OSHA standards for the use of respiratory protection in the form of respirators.

Particulate respirators (e.g. N-95 half-face respirators) are used in an atmosphere where there is adequate oxygen, and when undamaged and worn properly, effectively removes 95% of particulate matter from the breathing atmosphere for the user. This equipment requires more rigor to make and it is tested and certified by NIOSH for performance, thus, it will be more expensive per unit than a given mask, and may be less available. It also requires a tight fit and seal to be used, so having little to no facial hair is a requirement; it may be less comfortable than a mask for this reason. It catches user droplets/aerosols if there is no exhalation valve; however, it does provide greater protection to the user.

Misnomers

Filtering facepieces (another name for disposable particulate respirators) may also be called dust masks, which is a misnomer, given that masks and respirators are different devices as described above. Such facepieces are made of a cloth-like fiber. These should not be confused with nuisance dust masks, which are lightweight, often have one head strap, and are used for simple cleaning activities to protect from nontoxic dusts. Nuisance dust masks are not suitable for hazardous atmospheres and are not certified by NIOSH. The term facepiece is typically assigned to one part of a respirator. Depending on the respirator, there may be multiple parts beyond the facepiece such as head straps, head cradle, hood, valves, gaskets, cartridges, and/or a nose clip. In the case of a particulate respirator, the filtering facepiece is

used to refer to the whole unit. In contrast, for reusable respirators, the facepiece will be an impermeable solid part with filtering cartridges attached. Gas masks are another misnomer, in that they are air-purifying respirators that are full-face units, which protect users from airborne contaminants. They accept cartridges and the user must have the correct cartridge type to effectively protect against differing harmful agents.

Applicable Regulations

- 29 CFR 1910.134 – Respiratory Protection

Procedure

A. Respirator Selection

1. Respirators will be selected on the basis of workplace hazard assessments, as well as guidance from 29 CFR 1910.134, the American National Standard (ANSI) *Practices for Respiratory Protection Z88.2-1992*, the National Institute for Occupational Safety and Health (NIOSH) *Guide to Industrial Respiratory Protection* and the most current version of the NIOSH *Pocket Guide to Chemical Hazards.*
2. Final selection of any respiratory protection device must be made in consultation with EHS. Only NIOSH-approved respirators will be used.
3. The use of required respiratory protection equipment at TU is strictly limited to employees who document the need to utilize such equipment, pass and maintain an appropriate medical evaluation, attend annual training, and complete annual fit-testing (if required). These basic requirements are described below and elsewhere in this program.
4. Respirators are only to be used in situations where engineering controls are infeasible or during installation of such controls. EHS shall procure the appropriate respirators when such equipment is necessary to protect the health of the employee.
5. The Supervisor is required to identify the respiratory hazard(s) in the workplace and have these hazards evaluated to determine appropriate respiratory protective equipment. EHS is responsible for evaluating respiratory hazards and recommending appropriate levels of respiratory protection. If the Supervisor cannot identify the contaminant or if exposure levels are unknown, the exposure shall be considered Immediately Dangerous to Life and Health (IDLH). The Supervisor shall provide information as necessary to permit evaluation of hazards in the workplace that may affect respirator use.
6. The Supervisor must initiate the Respirator User Hazard Assessment Form for each employee required to utilize respiratory protection. This form shall be forwarded to EHS for documentation of hazard evaluations and determination of appropriate level(s) of respiratory protective equipment.
7. EHS will then forward the completed form to the Medical Monitoring Facility (MMF) to determine appropriate levels of medical surveillance for the identified tasks. Copies of the completed form will also be provided to the Supervisor and Employee.
8. Respirators will be selected on the basis of the worst-case anticipated health hazard considering the following:

a) The nature of the respiratory hazard;
b) The extent or concentration of the hazard;
c) The Permissible Exposure Limit (PEL) and Immediately Dangerous to Life and Health (IDLH) levels for the hazard. In the absence of a PEL, other suitable exposure guidelines such as the ACGIH Threshold Limit Values (TLV) will be utilized;
d) Work requirements and conditions;
e) Characteristics and limitations of available respirators;
f) Minimal equipment requirements established by regulation or policy;
g) Potential for skin absorption or severe eye irritation; and
h) Potential for oxygen deficiency or enrichment.

9. Air-purifying respirators shall not be used if:
   a) Atmospheres are oxygen-deficient (i.e., < 19.5% oxygen);
   b) Contaminant concentrations are considered Immediately Dangerous to Life and Health (IDLH);
   c) Contaminant concentrations are unknown; or
   d) In emergencies where the concentration and/or type of contaminant is unknown.

   Only respirators that can provide protection in excess of the anticipated airborne concentration will be selected. (Anticipated airborne concentration = NIOSH Protection Factor **X** PEL).
10. Selection criteria will be documented with the Respirator User Initial Hazard Assessment Form (see Appendix B). It is typically necessary to perform exposure monitoring to evaluate the need for and type of respiratory protection appropriate for the task(s).
11. EHS is responsible for final determination of employees respiratory protection needs.
12. The MMF must provide a respiratory protection medical certification for every employee required to wear a respirator and filed in the employees medical records.
13. Supervisors are required to have respirator selection criteria reassessed whenever circumstances change that may compel use of different levels of respiratory protection (i.e., introduction of new inhalation hazards or work practice modifications resulting in increased chemical exposures, etc.), or if the work environment places increased physical demands upon the employee. The Supervisor will make documentation of these changes on the Respirator User Hazard Assessment Update Form (see Appendix C).
14. The following factors shall be taken into account by EHS when selecting the proper respirator:
    a) Characteristics of the Hazardous Operation or Process
    b) Nature of contaminant
    c) Concentration of contaminant
    d) Respirator Enclosure Design
    e) Location of Hazardous Area
    f) Physical Conditions in Work Environment
    g) Vision
    h) Communications

15. Table 1 lists respirators (or related filter cartridges) by their respective filter efficiency. The filtering media in respirators are classified by NIOSH and are measured against their resistance to oil.
    a) The designations for each respirator type are based off of the efficiency in capturing aerosolized oil particles and are N, R, and P for not resistant, somewhat resistant, and oilproof, respectively.
    b) When oil-based products are used, they may evaporate or otherwise become airborne. Such products include fuel, lubricants, solvents, pesticides, paints, hydraulic and other machine oils.
    c) N-95 respirators are considered effective in removing 95% of aerosols in ambient air under normal conditions.
    d) The N series filter is used in environments free of oil mists. The R series filters can be exposed to oil mists, but should only be worn for one work shift. The P filter can be exposed to oil mists for longer than one work shift.
    e) HEPA respirators and filters are 99.97% effective in capturing particles that are 0.3 µm in size and larger. They may be used for capturing particles smaller than this size and are often used to capture particulates such as smoke, dirt, dust, liquid aerosols, and biologicals such as bacteria, viruses, fungi, pollen, and spores.

Table 1. NIOSH Respirator Filter Classes. The table displays respirators based on their resistance to oil (aerosol particles) and their respective efficiency in particle filtration, ranging from N-95 to P-100, the latter of which is oilproof and a considered high-efficiency particulate air (HEPA) quality filter.

	Filtering Efficiency of Airborne Particles		
Description	***95%***	***99%***	***99.97% (HEPA)***
Not Resistant to Oil (N)	N-95	N-99	N-100
Somewhat Resistant to Oil (R)	R-95	R-99	R-100
Resistant to Oil/Oilproof (P)	P-95	P-99	P-100

16. Respirator Type & Function
    a) Air-Purifying Respirators
        i. Particulate Respirator
            1) Simplest, least expensive, and least protective of the respirator types available. They are usually made of clothlike material, disposable, and used to protect against particles and aerosols (some fumes, mists). Examples include the N-95 filtering facepiece respirator or elastomeric respirator.
            2) Limitations are not protecting against airborne chemicals, gases, or vapors; intended only for low hazard levels; and must be replaced when discolored, damaged, or clogged. They can only be used in an atmosphere with adequate oxygen.

ii. *Chemical Cartridge/Gas Mask Respirator*
    1) *These are more expensive, as they are reusable, and protect against a wider variety of airborne hazards. This respirator includes a facepiece (half-face or full-face), and replaceable cartridges/canisters, which may also have filters to remove particles. Cartridges are color-coded based on the hazard protection.*
    2) *These respirators can be made from a variety of materials. The most popular facepiece materials are silicone, neoprene, and rubber. In general, rubber and neoprene are rigid, durable materials. Silicone is usually preferred for its comfort, flexibility, and ease in cleaning. Full-face respirators are available with strap harnesses or ratchet suspensions. The harness type can be worn under a hard hat, but ratchet suspensions are generally easier to adjust, making donning and doffing easier.*
    3) *Limitations include using the correct cartridge and/or filter for given hazards and its concentration in the air; the selection process may be complicated; and multiple cartridges may be required at once and for longer duration in a hazardous atmosphere. They can only be used in an atmosphere with adequate oxygen.*

iii. *Powered Air-Purifying Respirator*
    1) *These respirators use a fan to draw air through the filter to the user. They are easier to breathe through, and are available as half-face or full-face unit (use of a hood).*
    2) *Limitations include requirement of a fully-charged battery to work properly, more sensitive parts that may fail (fan motor), and similar limitations to other respirators that using chemical cartridges. They can only be used in an atmosphere with adequate oxygen.*

b) Air-Supplying Respirators **(Note: Towson University currently does not provide this equipment.)**
    i. *Airline Respirator*
        1) *Respirator is connected to a separate source of clean air via hose, no use of filters, unlimited volume of air, and protects against highest concentration of chemicals.*
        2) *Limitations include movement being limited by hose length, requires specialized training for use, and the system is cost-prohibitive to purchase, use, and maintain.*

    ii. *Self-Contained Breathing Apparatus*
        1) *Respirator is connected to wearable apparatus, including harness, gas cylinder, hose, and regulator. They protect against highest concentration of chemicals.*
        3) *Limitations include time in work area being limited by tank volume, and increased fatigue from equipment weight and heavier breathing (resulting*

in one hour or less of air available). It requires specialized training for use, and the system is cost-prohibitive to purchase, use, and maintain.

B. Voluntary Use of Disposable Filtering Facepiece

1. The program also covers employees who voluntarily use respiratory protective equipment. Voluntary use means that the employee wishes to use a respirator on the job even though the employer or regulation does not require it.
2. Filtering facepiece respirators (e.g., disposable dust masks) are often used to provide relief from nuisance levels of dusts and mists. They cannot be used for protection against fumes, vapors, gases, asbestos, sandblasting, or paint sprays.
3. If employees elect to voluntarily use disposable respirators, and if there are no identified inhalation hazards, disposable masks may be provided without medical certification or fit testing.
4. Employees using these disposable masks must be provided the information contained in Appendix A.
5. Supervisors are responsible for providing two copies of this appendix to affected employees. One copy must be signed and dated by the Employee and Supervisor and returned to EHS.
6. If the Supervisor permits voluntary use of any other type of respiratory protective device, the following apply:
    a) The Supervisor must complete the written Respirator User Hazard Assessment Form;
    b) The employee must receive medical clearance to use the respirator;
    c) The employee must receive training to understand that failure to properly clean, store, and maintain the respirator may present a health hazard to the user.
    d) This training is required initially and may be satisfied by the user reading and signing the Voluntary Use of Respirator Fact Sheet & Waiver Form contained in this program as Appendix D; and
    e) Respirators fit tests are not required.
7. If employees are required to wear any respirator, including filtering facepiece models, they must comply with all portions of the program, including medical evaluations and annual training. Workers wearing disposable respirators as protection against bloodborne pathogens or etiologic agents (inhalation or mucous membrane contact) must be medically certified and trained. Disposable respirators with listed protection factors (e.g., N-95 masks) must also be fit-tested at least annually.

C. Medical Evaluation

1. Prior to respirator fit testing, workers must be medically certified to wear the specified respirator without adverse health consequences.
2. Individuals not medically certified will not wear respirators.
3. Certification of medical capability shall be provided by a physician or other licensed health care professional (PLHCP) at the MMF.

4. Medical evaluations may be discontinued when the employee is no longer required to use a respirator.
5. Medical screening shall be conducted as follows:
    a) Employees
        i. *All employees participating in the Respiratory Protection Medical Surveillance Program must have a current and accurate Respirator User Hazard Assessment Form on file with the EHS.*
        ii. *Employees will be asked to verify the information contained in this form at prior to each examination.*
        iii. *After the Supervisor and EHS have completed the Respirator User Initial Hazard Assessment Form, the Supervisor shall contact EHS to schedule an appointment for the employee.*
        iv. *Supervisors are responsible for assuring attendance.*
        v. *Fees for missed appointments will be assessed against affected departments.*
    b) If any of the inhalation hazard or work condition information contained in the form changes, the supervisor shall submit a Respirator User Hazard Assessment Update Form to EHS for review, action, and transmittal to MMF. If substantial changes occur that may require additional medical evaluation, EHS will contact the Supervisor to schedule the affected employee(s) for additional evaluation.
    c) If an employee's medical certification is due for renewal, and there have been no changes affecting inhalation hazards or work conditions, the Supervisor shall check the appropriate block in the Respirator User Hazard Assessment Update Form and forward it directly to EHS at least 30 days prior to the expiration date. The Supervisor will be contacted by EHS to schedule the employee's re-evaluation.
    d) The medical evaluation will be conducted using the questionnaire in Appendix C of 29 CFR 1910.134 (see Appendix A of this program). The PLHCP will provide a copy of this questionnaire to all employees requiring medical evaluations.
    e) The PLHCP will assist employees who are unable to read the questionnaire.
    f) Medical evaluation parameters are determined by the PLHCP. Initial evaluations shall as a minimum include pulmonary function tests (FVC and FEV1) and completion of a medical history questionnaire. Subsequent medical evaluations and follow-up testing is determined by the PLHCP, the Respiratory Protection Standard or other substance-specific regulations detailing frequency of medical evaluations.
    g) All employees will be granted the opportunity to speak with a physician about their medical evaluation, if they so request.
    h) Employees, their supervisors and EHS will be provided a written pass/fail certification from the MMF stating parameters under which the individual is medically able to wear a respirator. Respirator approval certifications from the MMF will indicate an expiration date for the medical clearance.
    i) After an employee has received clearance and begun to wear his or her respirator, additional medical evaluations will be required under the following circumstances:

i. *Employee reports signs and/or symptoms related to their ability to use a respirator, such as shortness of breath, dizziness, chest pains or wheezing. The employee or supervisor should contact EHS immediately if this occurs.*
ii. *The PLHCP determines the employee needs to be reevaluated. The supervisor will be contacted by EHS to arrange scheduling.*
iii. *Information from this program, including observations made during fit testing and program evaluation, indicates a need for reevaluation. The supervisor will be contacted by EHS if this occurs.*
iv. *A change occurs in workplace conditions that may result in an increased physiological burden on the employee. The Supervisor is responsible for notification as described in Step C5b above.*

j) The MMF shall assure confidentiality of all examinations and questionnaires and shall maintain records of all medical testing, medical history questionnaires, and certifications of respirator use eligibility.

6. Any employee required for medical reasons to wear a positive pressure air-purifying respirator (e.g., PAPR) will be provided with such a device by the EHS.

D. Respirator Fit Testing

1. Basic Information
   a) The safe and effective use of respiratory protection equipment, especially negative pressure respirators, requires that the respirator be properly fitted to the employee. Poorly fitting respirators fail to provide the expected degree of protection.
   b) Additionally, no single model or size of respirator is capable of fitting all people.
   c) Several models may be needed to determine which provides an acceptable fit.
   d) Prior to being issued a re-useable, tight-fitting respirator, the employee must successfully pass a fit test for that specific brand, model, and size of respirator.
   e) Fit testing is conducted by EHS.

2. Interferences
   a) An employee cannot be fit tested nor wear a face-sealing respirator if there is any facial hair present between the skin and facepiece-sealing surface.
   b) More than slight beard stubble at the sealing surface is considered excessive facial hair.
   c) Any other condition that interferes with the sealing surface of the facepiece or interferes with the valve function shall be identified during fit testing and corrected. See Step I for more information.
   d) Any employee who experiences difficulty breathing or exhibits severe psychological reaction during any phase of fit testing shall be referred to the MMF by EHS to re-evaluate whether the employee is capable of wearing a respirator.

3. Fit testing shall be repeated at least annually or more frequently if any change occurs which may alter respirator fit. Such changes may include:

a) Weight change of 20 pounds or more;
b) Significant facial scarring in areas of the face seal;
c) Significant dental changes (e.g., multiple extractions or new dentures);
d) Reconstructive or cosmetic surgery in the head/face; or
e) Any condition which may affect the face-respirator seal.

4. EHS shall maintain records of current fit tests to assure testing currency.
5. Supervisors are responsible for ensuring employees have been fit tested within the past 12 months and shall ensure that respirators are not issued to nor used by any employee who has not met this requirement.
6. A fit test shall be used to determine the ability of each individual respirator wearer to obtain a satisfactory fit with any air-purifying or supplied-air respirator.
7. <u>Fit Test Methods</u>
   a) Quantitative fit tests will be performed at TU.
   b) Qualitative fit tests will be performed if testing equipment deficiencies preclude use of quantitative testing methods.
   c) Fit testing methods shall conform to the minimum requirements as detailed in Appendix A of 29 CFR 1910.134 (see Appendix A of this program).
   d) Personnel must successfully pass the fit test before being issued a respirator, and at least annually thereafter.
   e) Qualitative Fit Tests:
      i. *The worker is exposed to an atmosphere containing an irritating aerosol and then asked to perform several exercises to challenge the respirator fit.*
      ii. *The wearer reports any noticeable irritation caused by mask leaks.*
   f) Quantitative Fit Test:
      i. *A device (Portacount Model 8048, TSI and associated Particle Generator) is used to accurately measure respirator fit by comparing the dust concentration in the surrounding air with the dust concentration inside the respirator.*
      ii. *The ratio of these concentrations is called the Fit Factor.*
      iii. *A modified filter cartridge (or a modified respirator facepiece) equipped with a sampling port is used to collect air from inside the respirator.*
      iv. *With the sampler attached, the wearer is asked to perform several exercises to challenge the respirator fit.*
      v. *During these movements, any leakage is measured by the particle counting device. A computer stores the fit test data and a final fit test report is generated.*
      vi. *For half-face or filtering facepiece respirators, an acceptable fit test is a measured fit factor of at least 100.*
      vii. *Full-face respirators must demonstrate an acceptable fit factor of at least 500.*
   g) Supervisors are responsible for ensuring employees are fit tested at least once per year.

h) If any conditions or circumstances are observed by the Supervisor that may affect the fit of an employee's respirator, the Supervisor shall ensure respirators are not worn unless fit testing is repeated.
i) Copies of fit test reports will be given to the employee, forwarded to the Supervisor, and maintained by EHS.
j) Supervisors are to ensure that employees are provided the specific brand, model, and size of respirator indicated in the fit test report.
k) Respirators shall not be used unless successful fit testing has been demonstrated.

E. Respirator Donning/Doffing

2. Prior to use, the employee should thoroughly wash their hands with soap and water, or use alcohol-based gel or handwipes, and ensure that your hands are dry.
3. Inspect the respirator for damage.
   a) If the unit is damaged, do not use the unit.
   b) If the unit is reusable, replace parts appropriately. Otherwise, it must be discarded.
   c) If the unit is disposable, it must be discarded.
4. For Particulate Respirators
   a) To don the respirator, cup the facepiece of the unit with one hand, with straps hanging below the facepiece.
   b) Cover nose and mouth with the facepiece, with straps over the hand.
   c) Pull both straps over the head, extending the bottom strap to below the hairline on the neck (below the ears) and the top strap to the crown of the head, where it does not slip (above the ears). Straps should not cross.
   d) The facepiece should have a nose clip (metal or otherwise) in order to create a better seal. Use the fingertips with steady pressure (index fingers on both hands) to mold the clip to the shape of your nose. Be careful not to create a fine point at the top of the clip to avoid hurting the bridge of the nose, which also does not create a proper seal. This should be done in one motion. Repeated poking and pushing will shift the facepiece or create uneven pressure on the clip, and not a proper seal.
   e) A seal check should be conducted by putting both hands over the facepiece, inhaling (breathing deeply), and then exhaling. Readjust straps, nose clip, or facepiece, if leakage is felt at the nose or elsewhere.
   f) Wear the respirator as long as appropriate.
   g) Avoid touching the respirator while using it. If you accidentally touch it, wash your hands. Avoid touching your face (eyes, nose, mouth) while wearing the respirator.
   h) To doff, remove the straps and take caution to not touch the facepiece.
   i) Discard the respirator.
   j) Repeat Step E1.

5. For Reusable Respirators
    a) To don the respirator, cup the facepiece of the unit with one hand, with straps hanging below the facepiece.
    b) Cover nose and mouth (or full face) with the facepiece, with straps over the hand.
    c) Pull straps over the head, and tighten appropriately, from the neck on each side simultaneously up to the top of the head.
    d) Attach cartridges as required.
    e) A seal check should be conducted by putting both hands over the cartridges, inhaling (breathing deeply), and then exhaling. Readjust straps, or facepiece, if leakage is felt.
    f) Wear the respirator as long as appropriate.
    g) Avoid touching the respirator while using it. If you accidentally touch it, wash your hands. Avoid touching your face (eyes, nose, mouth) while wearing the respirator.
    h) To doff, untighten and remove the straps and take caution to not touch the facepiece or cartridges. Cartridges should be removed with use of appropriate gloves based on the contaminant(s) and discarded.
    i) Clean the respirator and store properly.
    j) Repeat Step E1.

F. Respirator Maintenance & Storage

1. Manufacturers' recommended procedures are included with each new respirator.
2. The information in Step F is intended as a general guideline for appropriate cleaning, storage, inspection, and maintenance practices and should not supersede manufacturers' recommended procedures.
3. <u>Cleaning & Disinfection</u>
    a) Respirators should be cleaned and disinfected regularly.
    b) Respirators issued for the exclusive use of one worker may be cleaned as often as necessary.
    c) Shared respirators or emergency use respirators must be cleaned and disinfected after each use.
    d) The following procedures are provided for employee's use when cleaning respirators. They are general in nature, and the employee as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators provided such procedures are as effective as those listed below. Equivalent effectiveness simply means that the procedures used must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.
        i. Procedures for Cleaning Respirators
            1) Remove filters, cartridges, or canisters.
            2) Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer.

3) *Discard or repair any defective parts.*
4) *Wash components in warm (110 ^{0}F maximum) water with a mild detergent or with a cleaner recommended by the manufacturer.*
5) *A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.*
6) *Rinse components thoroughly in clean, warm (110 ^{0}F maximum), preferably running water and drain.*
7) *When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:*
   A. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter (one tablespoon) of laundry bleach ("Clorox") to one gallon of warm (110 ^{0} F maximum);
   B. 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 warm (110 ^{0} F maximum) water; or
   C. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
8) *Rinse components thoroughly in clean, warm (110 ^{0} F maximum), preferably running water and drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis (skin irritation). In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.*
9) *Components should be hand-dried with a clean lint-free cloth or air-dried.*
10) *Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.*
11) *Test the respirator to ensure that all components work properly.*

4. <u>Storage</u>
   a) When not in use, the respirator and cartridges should be kept in a sealed, airtight container (e.g., zippered storage bag) and stored in a clean, dry, moderate temperature and non-contaminated environment.
   b) It is especially important to keep gas and vapor cartridges in a sealed container, so they do not passively adsorb gases and vapors from the storage area and thereby reduces the filter service life. Particulate filters should also be protected from dusts and dirt.
   c) Emergency use respirators should be stored in a sturdy clean compartment that is quickly accessible in the work area and clearly marked.

5. <u>Inspection Procedures and Schedules</u>
   a) Each respirator shall be inspected routinely before and after use.
   b) A respirator shall be inspected by the user immediately prior to each use to ensure that it is in proper working condition.
   c) After cleaning, each respirator shall be inspected to determine if it is properly functioning or if it needs repairs or replacement of parts.

d) Respirators stored for emergency or rescue use shall be inspected at least monthly and before and after each use.
e) Monthly inspections must be documented and include the date of inspection, name or signature of inspector, inspection findings, required remedial action and a serial number identifying the respirator.
f) SCBA cylinders for emergency use shall be maintained in a fully charged state and recharged when pressure falls to 90% of the manufacturers recommended pressure level. Inspections must include determination that the regulator and warning devices function properly. **Note: TU does not currently provide SCBAs.**
g) Manufacturer recommendations shall be followed for equipment inspection, but should include at a minimum:
    i. *Inspection Checklist for Filtering Facepiece Respirators:*
        1) *Holes in filter*
        2) *Elasticity of straps*
        3) *Deterioration of straps and metal nose clip*

    ii. *Inspection Checklist for Air-Purifying Respirators:*
        1) *Facepiece*
            A. Dirt
            B. Cracks, tears, or holes
            C. Distortion of facepiece
            D. Cracked, scratched, or loose-fitting lenses
        2) *Head Straps*
            A. Breaks or tears
            B. Loss of elasticity
            C. Broken buckles or attachments
        3) *Inhalation and Exhalation Valves*
            A. Dust particles, dirt, or detergent residue on valve and valve seat
            B. Cracks, tears, or distortion in valve material
            C. Missing or defective valve covers
        4) *Filter Elements*
            A. Proper filter for the hazard
            B. Approval designation
            C. Missing or worn gaskets
            D. Worn threads on filter and facepiece
            E. Cracks or dents in filter housing
            F. Deterioration of canister harness
            G. Service life indicator, or end of service date
            H. Date filters installed
        5) *Breathing Tube*
            A. Cracks or holes
            B. Missing or loose hose clamps
            C. Broken or missing end connectors

    iii. *Inspection Checklist for Atmosphere-Supplying Respirators:*
        1) *Facepiece*
            A. Dirt
            B. Cracks, tears, or holes

C. Distortion of face piece
D. Cracked, scratched, or loose-fitting lenses

2) Head Straps

A. Breaks or tears
B. Loss of elasticity
C. Broken buckles or attachments

3) Hood, Helmet, Blouse, or Full Suit

A. Rips or torn seams
B. Headgear suspension
C. Cracks or breaks in faceshield
D. Protective screens that are intact and fit correctly over faceshields, hoods, or blouses

4) Air Supply Systems

A. Breathing air quality
B. Breaks or kinks in air supply hoses and fittings
C. Tightness of connections
D. Settings of regulators and valves
E. Adequate pressure and/or airflow
F. Correct operations of air-purifying elements and alarm for carbon monoxide or high temperatures

6. Maintenance of Respirators
   a) Respirators are to be properly maintained at all times to ensure that they function properly and adequately protect the employee.
   b) Maintenance involves a thorough visual inspection for cleanliness and defects. Worn or deteriorated parts will be replaced prior to use.
   c) No components are to be replaced or repairs made beyond those recommended by the manufacturer.
   d) All repairs or adjustments to regulators, reducing and admission valves, or alarms of atmosphere-supplying respirators will be conducted by the manufacturer.
   e) Consult the manufacturer or distributor for replacement parts and filters.
   f) Compressed air cylinders must be tested and maintained as prescribed in Department of Transportation regulations 49 CFR Part 173 and 49 CFR Part 178. These regulations detail requirements for scheduled hydrostatic testing, maintenance, etc. Supervisors with compressed air respirator equipment must be thoroughly familiar with the requirements pertaining to their equipment and shall ensure appropriate maintenance and service. **Note: TU does not currently supply this equipment to its employees for use with respirators.**

G. Respirator Cartridges

1. Filtering Types for Reusable Respirators
   a) Particulate Filters
      i. This equipment filters aerosolized solid or liquid particles that are airborne.
      ii. These particles can include dust, pollen, mold spores, bacteria, viruses, fungi, and aerosols generated from sprays or mists.

iii. *Filters are categorized based on their efficiency levels in trapping particles of different sizes:*
   1) *P1 filters for larger particles such as coarse dust and debris.*
   2) *P2 filters for smaller particles such as microorganisms and fumes.*
   3) *P3 filters for fine particles, including fine dust, asbestos fibers, and certain viruses.*

b) Gas/Vapor Filters
   i. *This equipment adsorbs or neutralizes gas or vapor that are airborne.*
   ii. *The filters may be composed of one of the following:*
      1) *Activated carbon filters, which entrap gas/vapor molecules (e.g. odors, vapors, and fumes).*
      2) *Chemical filters, which neutralize gas/vapor molecules via chemical reaction to remove the hazard to the user.*

c) Cartridges & Canisters
   i. *Cartridges and canisters are combination units that combine differing filter capabilities such as (e.g. an adsorbent and a particulate filter).*
   ii. *Canisters are generally larger units that have similar capabilities to cartridges. Canisters are typically attached to gas masks while cartridges are used for various other respirators.*

Table 2. NIOSH Color Code. The table lists equipment colors based on the contaminant present. Equipment may have multiple colors to indicate dual or combination filters.

Contaminant	Color Code on Canister/Cartridge
Acid Gases	White
Acid Gases & Organic Vapors	Yellow
Ammonia Gas, Methylamine	Green
Acid Gases & Ammonia Gas	Green w/ White (0.5 in. Stripe at Bottom)
Acid Gases, Ammonia, & Organic Vapors	Brown
Carbon Monoxide	Blue
Chlorine Gas	White w/ Yellow (0.5 in. Stripe at Bottom)
Hydrocyanic Acid Gas	White w/ Green (0.5 in. Stripe at Bottom)
Hydrocyanic Acid Gas & Chloropicrin Vapor	Yellow w/ Blue (0.5 in. Stripe at Bottom)
Multi-Contaminant/CBRN Agent (Chemical, Biological, Radioactive, Nuclear)	Olive Green
Organic Vapors	Black
Particulates (Any), HEPA/P-100 Filters	Purple
Particulates (Any), P-95, P-99, R-95, R-99, R-100	Orange
Particulates (Non-Oil), N-95, N-99, N-100	Teal
Pesticides	Black & Purple
Radioactive Materials (Except Tritium, Noble Gases)	Purple (Magenta)

2. Color Coding of Air Purifying Respirator Canisters, Cartridges, and Filters
   a) Table 2 above lists the color code for disposable respirator elements such as canisters, cartridges, and filters.
   b) Appropriate use of these respirator elements will be based on the contaminant and its concentration in the work area. Always follow NIOSH guidance for appropriate use of such equipment.

3. Change Out Schedule
   a) Air-purifying respirators function by removing contaminants from air before inhalation.
   b) Contaminants are removed by filtration (e.g., for asbestos, glass fiber), adsorption (e.g., for benzene, carbon tetrachloride), or by chemical reaction (e.g., for ammonia).
   c) Filters or cartridges designed for contaminant removal have limited effective service lives.
   d) The service life of a cartridge depends upon many factors, including environmental conditions, breathing rate, cartridge filtering capacity, and the amount of contaminants in the air.
   e) A safety factor should be applied to the service life estimate to assure that the change schedule is a conservative estimate.
   f) All air-purifying respirators used for protection against gases and vapors must have an end-of-service-life indicator (ESLI) or have a cartridge change schedule that is based upon objective information or data to ensure that filter cartridges are changed before the end of their service life.
   g) The following filter cartridge change schedule in Table 3 is based upon OSHA standards, manufacturer's recommendations, and the ACGIH “Rule of Thumb”.

Table 3. Cartridge Change Schedule. The table lists equipment use and disposal frequency based on the contaminant present. Equipment may be replaced more often as conditions may require.

Contaminant	Filter Cartridge Change Schedule
Formaldehyde	Every 3 hours or end of shift (whichever comes first)
Ammonia (≤ 125 ppm)	Maximum one shift (≤ 8 hrs)
HCl, SO_2, Cl_2	Maximum one shift (≤ 8 hrs)
Methylene Chloride	FORBIDDEN. Must use Supplied Air
Organic Vapors (≤ 200 ppm)	Maximum 8 hours use total
Emergency Use	Discard after each use
HEPA Filters	Restricted breathing or visibly dirty, wet, or damaged
Filtering Facepiece	Visibly dirty/contaminated

h) The ACGIH "Rule of Thumb" states:
   i. *If the chemical's boiling point is > 70 °C and the concentration is less than 200 ppm, you can expect a service life of 8 hours at a normal work rate.*
   ii. *Service life is inversely proportional to work rate.*
   iii. *Reducing concentration by a factor of 10 will increase service life by a factor of 5.*
   iv. *Humidity above 85% will reduce service life by 50%.*

i) In addition to the above, respirator cartridges will be immediately changed if any of the following conditions exist:
   i. *The employee senses the contaminated environment you are working in;*
   ii. *The cartridges become wet;*
   iii. *The cartridge is damaged; or*
   iv. *It becomes difficult to breathe.*

H. Supplied Air Respirator Requirements

1. Supply-air respirators pose additional hazards due to the need to assure provision of adequate air. The use, inspection, and maintenance of supply air respirators require implementation of additional procedures. **Note: Towson University currently does not provide this equipment.**
   a) Air Quality
      i. *Airline respirators and self-contained breathing apparatus (SCBA) must deliver an acceptable air quality to the user.*
      ii. *SCBA and other cylinder-supplied respirators:*
         1) *Only Grade D breathing air shall be permitted for use in cylinders.*
         2) *The Supervisor is required to document the acceptability of breathing air by obtaining a report of the air quality from the supplier and inserting it in Appendix C of this program. It is recommended that such documentation be obtained at least yearly from the supplier.*
         3) *If a new supplier is used, documentation must be obtained prior to use of the breathing air.*
         4) *The Supervisor is responsible for ensuring inspections are conducted and records are available for inspection.*
         5) *The Supervisor shall include details of the inspection program (procedures, responsibilities, document locations) in Appendix B of this program.*
      iii. *Breathing air compressors. Air compressors used to supply breathing air to respirators must be specifically approved for such use. They must be constructed and used so that:*
         1) *Contaminated air is not allowed into the air-supply system;*
         2) *Moisture content is minimized so that the dew point at one atmosphere pressure is 10^{o}F below the ambient temperature;*
         3) *Suitable in-line air-purifying sorbent beds and filters are installed to ensure breathing air quality;*

4) *Sorbent beds and filters are maintained and replaced per the manufacturer instructions. A tag indicating the most recent change date and the supervisors' signature shall be maintained at the compressor;*
5) *Carbon monoxide concentrations must not exceed 10 parts per million;*
6) *Oil-lubricated compressors have a high-temperature alarm; and*
7) *Breathing airline couplings are incompatible with outlets for non-respirable gases in the workplace.*

iv. *Breathing air with oxygen concentrations over 23.5% or liquid oxygen shall not be used without specific approval from the Respiratory Protection Program Administrator.*

I. Special Situations/Proper Hygiene

1. Facial Hair
   a) All employees must be clean-shaven to remove facial hair that could interfere with the face to facepiece seal area or function of the face piece whenever they wear a respirator.
   b) Employees who have a medical condition, which precludes their ability to be clean-shaven on the job, must consult with their Supervisor and the Administrator. If necessary, the employee may be referred to the University's contracted MMF for a medical evaluation of his condition as it regards shaving facial hair.

2. Corrective Lenses
   a) Employees who require corrective lenses (e.g., glasses) must take special precautions to ensure that their eyeglass frames do not interfere with the respirator seal.
   b) Eyeglasses with temple bars will not be worn with full-face respirators including PAPRs and SCBAs.
   c) A spectacle kit recommended by the manufacturer of the employee's respirator will be provided by the employee's Department to the employee at no charge.
   d) The employee is responsible for the procurement and installation of his prescription lenses in the respirator spectacle kit in accordance with the University's policy on employee safety glasses contained in the TU Personal Protective Equipment (PPE) Program.
   e) The wearing of prescription eyeglasses with half-face air purifying respirators (APR) will be done in such a manner as not to interfere with the seal of the facepiece. If the employee is unable to wear his eyeglasses with a half-face APR, a full-face APR shall be worn with the proper spectacle kit installed.
   f) Contact lenses may be worn with full-face respirators but will not be worn with half-face APRs.

3. Other Interferences
   a) There may be other interferences with use (including for fit tests), which include the following:

i. *Application of health and beauty products including cosmetics, oils, and petroleum jelly, or related products, which may prevent a proper seating or seal;*
ii. *In some cases, headwear, hairstyle, or other hair properties may prevent a proper seating or seal; and*
iii. *Moisture from high humidity, liquid from a splash, excessive perspiration, or other source will make a respirator less effective, as the seal will become loose and/or the filter may weaken or become damaged.*
    1) *Moderate the conditions to reduce humidity, if possible.*
    2) *Check the respirator for integrity and any moisture.*
    3) *If the disposable filter or respirator is damaged, it must be discarded and replaced or for reusable respirators, the facepiece and straps may be wiped clean and filters discarded and replaced.*

J. Program Evaluation

1. Periodic Review
    a) Periodic review of the effectiveness of the respirator program is essential.
    b) EHS will conduct periodic surveys to determine the effectiveness of the respirator program.
        i. *This will include worksite inspections, interviews with respirator wearers, air monitoring, and review of records.*
    c) Acceptance of respirators by users is especially important. Users will be consulted periodically about their acceptance of wearing respirators.
        i. *This includes comfort, resistance to breathing, fatigue, interference with vision, interference with communications, restriction of movement, interference with job performance, and confidence in the effectiveness of the respirator to provide adequate protection.*

2. Corrections
    a) The above information can serve as an indication of the degree of protection provided by respirators and the effectiveness of the respirator program. Action shall be taken to correct any deficiencies found in the program. The findings of the respirator program evaluation will be reported, and the report shall list plans to correct faults in the program and target dates for the implementation of the plans.

K. Emergency Procedures

1. In the event of a respirator failure or malfunction, the employee should immediately leave the contaminated environment and move to an uncontaminated area before removing his respirator.
2. Do not re-enter the contaminated environment until the source of the respirator malfunction has been identified and corrected.

L. Training

1. All employees who will use a respirator will be required to complete the training program before initial use and before their annual renewal date.
2. Employees must pass a training examination with a score of ≥ 80% and practical exercise demonstrating the proper donning and doffing of their respirator.
3. Training program objectives will include specific procedures applicable to their work areas and assignments as contained in the written program.
4. Each respirator wearer shall be given initial training covering the following topics:
   a) Contents of the OSHA Respiratory Protection Standard
   b) Respiratory Hazards and Health Effects
   c) How Respirators Work
   d) Engineering Controls vs. Respirator Use
   e) Medical Evaluation
   f) Respirator Selection Rationale
   g) Proper Use and Limitations of Respirators
   h) Fit Testing
   i) Respirator Donning/Doffing
   j) Fit Checks
   k) Maintenance, Cleaning and Storage
5. Training for use of self-contained breathing apparatus (SCBA) will be in addition to the training above and provided by a qualified off-campus training provider and coordinated through EHS.
6. Annual re-training is required of all employees who wear respirators.
7. Training will be scheduled and completed prior to their annual refresher due date.
8. Training will occur prior to fit testing and achieving a passing score of ≥ 80% on the training exam is a prerequisite for fit testing. Individuals who score < 80% on the training exam will not be fit tested until such time as they are able to achieve a passing score.
9. Re-training will be required before the annual refresher due date if:
   a) There are changes in the work area that impact respirator use (rendering previous training obsolete);
   b) The employee no longer has the skill and understanding to follow and use the respirator per previous training and terms of the program; or
   c) Any other situations arise that cause the supervisor or program administrator to recommend the employee is retrained.
10. All University Employees who use respirators, in addition to annual training, must also receive annual fit testing.
11. Assistance will be provided by EHS to any Department requesting guidance, fit testing, or training to satisfy implementation of this policy. Please contact EHS at (410) 704-2949 or via email at safety@towson.edu.

Resources

A. OSHA

1. Respirator Medical Evaluation Questionnaire Information
2. Properly Donning/Doffing N-95 Respirator

B. NIOSH

1. NIOSH Guide to Industrial Respiratory Protection
2. NIOSH Pocket Guide to Chemical Hazards

C. ANSI

1. ANSI Z88.2: Practices for Respiratory Protection
2. ANSI Z88.6: Physical Qualifications for Personnel
3. ANSI Z88.7: Color Coding of Air Purifying Respirator Canisters, Cartridges, and Filters

D. Environmental Health & Safety

To request documents, reviews for procedures or equipment, fit testing, or general inquiries, contact EHS by emailing safety@towson.edu or by calling the Environmental Health & Safety (EHS) office at 410-704-2949.

Appendix A: Respiratory Protection Standards & Regulations

29 CFR 1910.134: Respiratory Protection, including Appendices A-D
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppA
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppB1
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppB2
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppC
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppD

ANSI Z88.2: Practices for Respiratory Protection

ANSI Z88.6: Physical Qualifications for Personnel

ANSI Z88.7: Color Coding of Air Purifying Respirator Canisters, Cartridges, and Filters

Appendix B: Respirator User Initial Hazard Assessment Form

PART 1: To be completed by the Supervisor (Please print the following information)	
Employee Name	Phone
Supervisor Name	Phone
Supervisor Signature	Date
Department/Unit	

This form is used to provide information for employees who are required to be enrolled in the TU Respiratory Protection Program. Please answer the following questions completely.

1. Will this respirator be used for the following (Check Yes or No)?
Emergency Response? □ Yes □ No Firefighting? □ Yes □ No
In Oxygen-Deficient Areas? □ Yes □ No Non-Emergency Escape? □ Yes □ No

2. How often is employee expected to wear respirator (Check one)?
□ Escape Only □ 2-4 Hours per Day
□ Less than 5 Hours per Week □ Over 4 Hours per Day
□ Less than 2 Hours per Day □ Other:

3. Indicate typical daily work by employee while wearing respirator:

a. Hours performing light work: _____
(E.g., sitting while writing, light assembly work, standing while operating light machinery)

b. Hours performing moderate work: _____
(E.g., sitting while drilling or nailing, driving a vehicle in urban traffic, transferring a moderate load)

c. Hours performing heavy work: _____
(E.g., lifting heavy load, shoveling, standing while bricklaying, climbing stairs with a heavy load)

4. Describe work conducted by employee while wearing respirator:

5. Describe protective clothing (other than respirator) that the employee will wear while using respirator:

6. Describe temperature and humidity condition extremes that this employee will experience while wearing respirator:

7. Describe any special or hazardous conditions that this employee may encounter when wearing the respirator (e.g., confined space access, hazardous materials incident response, rescue duties, use of heavy equipment, etc.):

8. Describe any responsibilities that this employee will have while wearing the respirator that may affect the safety and well-being of others (e.g., rescue, security, etc.):
9. Indicate the type(s) of respirator you anticipate this employee to require: □ Disposable mask □ Full-face APR □ Tight-fitting PAPR □ Airline (compressor) □ Half-face APR □ Loose-fitting PAPR □ Airline (compressed air) □ SCBA
10. If so equipped, indicate the type(s) of filters or pre-filters you anticipated are required for the employee respirator:
11. Is this employee expected to be facially clean-shaven when wearing the respirator (Check Yes or No)? □ Yes □ No
12. While wearing the respirator, will this employee be exposed to fumes, vapors, or gases that are corrosive or irritating to the eyes (Check Yes or No)? □ Yes □ No
13. Indicate the type of corrective lens this employee will wear (if necessary) when using the respirator (check one box): □ Spectacles □ Contact Lenses □ Not Required
PART 2: To be completed by EHS (Please print the following information)
This section is to be completed by the Department of Environmental Health & Safety (EHS). Copies of the completed form will be forwarded to the employee, the employee's supervisor, and the University's Medical Monitoring Facility.
EHS recommended type of respiratory protective equipment: □ Disposable mask □ Full-face APR □ Tight-fitting PAPR □ Airline (compressor) □ Half-face APR □ Loose-fitting PAPR □ Airline (compressed air) □ SCBA
Special Conditions/Comments:

EHS/Industrial Hygienist Name (Print)

EHS/Industrial Hygienist Signature	**Date**

Appendix C: Respirator User Hazard Assessment Update Form

PART 1: To be completed by the Supervisor (Please print the following information)	
Employee Name	Phone
Supervisor Name	Phone
Supervisor Signature	Date
Department/Unit	

This form is used to provide update information for employees currently enrolled in the Respiratory Protection Program. Please check the appropriate block(s) and process form as indicated:

□ Employee's medical clearance must be renewed. No changes have occurred that impact respirator use or physical working conditions. (Forward form to EHS for forwarding to the University's Medical Monitoring Facility [MMF].)

□ Employee is exposed to inhalation hazards that have not previously been assessed. (Provide specific information in Part 2 of this form for new inhalation hazards, forward form to EHS.)

□ Employee's physical working conditions while wearing respiratory protection have changed. (Provide specific information concerning changes in Part 1 of this form, forward form to EHS for forwarding to the University's MMF.)

□ Employee's medical clearance must be renewed. Other changes have occurred that impact respirator use or working conditions. (Provide specific information concerning changes in Part 1 or Part 2 of this form, forward form to EHS.)

□ Other changes have occurred that may impact the employee's use of respiratory protection. (Provide details regarding changes in Part 1 or Part 2 of this form, and/or describe changes in the space below, forward form to EHS):

Only enter information below that has changed for this employee

1. Will this respirator be used for the following (Check Yes or No)?
Emergency Response? □ Yes □ No Firefighting? □ Yes □ No
In Oxygen-Deficient Areas? □ Yes □ No Non-Emergency Escape? □ Yes □ No

2. How often is employee expected to wear respirator (Check one)?
□ Escape Only □ 2-4 Hours per Day
□ Less than 5 Hours per Week □ Over 4 Hours per Day
□ Less than 2 Hours per Day □ Other:

3. Indicate typical daily work by employee while wearing respirator:

a. Hours performing light work: _____
(E.g., sitting while writing, light assembly work, standing while operating light machinery)

b. Hours performing moderate work: _____
(E.g., sitting while drilling or nailing, driving a vehicle in urban traffic, transferring a moderate load)

c. Hours performing heavy work: _____
(E.g., lifting heavy load, shoveling, standing while bricklaying, climbing stairs with a heavy load)

4. Describe work conducted by employee while wearing respirator:

5. Describe protective clothing (other than respirator) that the employee will wear while using respirator:

6. Describe temperature and humidity condition extremes that this employee will experience while wearing respirator:

7. Describe any special or hazardous conditions that this employee may encounter when wearing the respirator (e.g., confined space access, hazardous materials incident response, rescue duties, use of heavy equipment, etc.):

8. Describe any responsibilities that this employee will have while wearing the respirator that may affect the safety and well-being of others (e.g., rescue, security, etc.):

9. Indicate the type(s) of respirator you anticipate this employee to require:

□ Disposable mask □ Full-face APR □ Tight-fitting PAPR □ Airline (compressor)
□ Half-face APR □ Loose-fitting PAPR □ Airline (compressed air) □ SCBA

10. If so equipped, indicate the type(s) of filters or pre-filters you anticipated are required for the employee respirator:

11. Is this employee expected to be facially clean-shaven when wearing the respirator (Check Yes or No)?
□ Yes □ No

12. While wearing the respirator, will this employee be exposed to fumes, vapors, or gases that are corrosive or irritating to the eyes (Check Yes or No)? □ Yes □ No

13. Indicate the type of corrective lens this employee will wear (if necessary) when using the respirator (check one box): □ Spectacles □ Contact Lenses □ Not Required

PART 2: To be completed by Supervisor and EHS (Please print the following information)

This section is to be completed by both the supervisor and Department of Environmental Health & Safety (EHS). The following information is to be provided for each **new** inhalation hazard (i.e., each hazardous substance) the employee is expected to encounter while wearing the respirator, completed by the supervisor. Shaded sections are to be completed by EHS.

Inhalation hazard:

Describe activity causing this hazard:

Describe duration of exposure (hours/day, days/year, etc.):

A. Observed Employee Exposure Rate: B. PEL/TLV of Other Published Exposure Limit: C. Method Utilized to Determine Employee Exposure:

PART 3: To be completed by Supervisor and EHS (Please print the following information)
This section is to be completed by Department of Environmental Health & Safety (EHS). Copies of the completed form will be forwarded to the employee, the employee's supervisor, and the University's Medical Monitoring Facility.
Type of respiratory protective equipment approved: Special Conditions/Comments:

EHS/Industrial Hygienist Name (Print)

EHS/Industrial Hygienist Signature	**Date**

Appendix D: Voluntary Use of Respirator Fact Sheet & Waiver Form

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 respirator 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 a respirator that belongs to someone else.

Policies and Procedures

I. I understand I am using respiratory protection strictly on a voluntary basis.

II. I understand the use of negative pressure respirators can pose certain hazards if not used in accordance with the manufacturer's instructions.

III. I acknowledge that Towson University has a Written Respiratory Protection Program (WRP).

IV. I further acknowledge I may obtain a copy of the WRP from the Department of Environmental Health and Safety or view this program on the Department's website.

V. I acknowledge that I received a copy of the manufacturer's instructions on the use and limitations of the respirator for which I received.

VI. I also acknowledge receiving a copy of Appendices D of the OSHA standard for respiratory protection 29 CFR 1910.134. I understand I have the opportunity to discuss any of these items with EHS.

VII. I agree to follow the manufacturer's instructions and abide by TU policies for the use of respirators.

VIII. **I understand and expressly assume all the risks and dangers of voluntarily using a respirator, and I hereby release, waive, discharge, and covenant not to sue Towson University, the University System of Maryland, the State of Maryland, and their officers, agents, servants, and employees (collectively, the "Releasees") from all liability, claims, demands, actions, or causes of action whatsoever arising out of any damages, loss, or injury to me or to my property because of my use of the respirator given to me by Towson University. I also hereby release, waive, discharge and covenant not to sue the Releasees from any claims whatsoever on account of any first aid, treatment, or service rendered to me during my participation in the above activity. I hereby agree to indemnify and hold harmless the Releasees from any loss, liability, damage, or costs, including court costs and attorneys' fees, that they may incur due to my use of the respirator given to me by Towson University.**

IX. I agree, for myself and my successors, that the above representations and agreements are contractually binding, and are not mere recitals. I agree that my failure or refusal to sign such agreements or releases shall in no way affect the validity of this Agreement, nor revoke or cancel any of the terms of this Agreement. I or any of my successors shall be liable for the expenses (including legal fees) incurred by the party or parties in defending against such claim or suit. This Agreement shall not be modified orally.

I have carefully read this form and fully understand its contents. I am aware that this is a release of liability, a waiver of claims, an agreement not to sue, an indemnity, and a contract between myself and Towson University and for the benefit of others described herein, I sign it of my own free will.

Employee Name (Print)	**Respirator Model #**

Employee Signature	**Date**

Note: A signed copy must be submitted to the Department of Environmental Health and Safety (EHS).