University of Rochester
Respiratory Protection Program

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Introduction

The University of Rochester Respiratory Protection Program is designed to protect University employees and students by establishing acceptable practices for respirator use and providing guidance for proper selection, maintenance, use, and storage of respirators and clearance and training of respirator users.

This program applies to all University of Rochester employees and students who need to wear a respirator to perform assigned duties. Any employee or student who voluntarily wears a respirator when one is not required must do so in full compliance with this document.

Many substances may be harmful if inhaled. These may be dusts such as wood dusts or chemical powders, mists such as water-based chemical sprays, gaseous chemicals, fumes from operations such as welding, vapors such as evaporating cleaning solvents, or aerosolization of microorganisms such as mycobacterium tuberculosis (TB). When it is not possible to remove these hazards with engineering controls (for example, substituting non-harmful products or installing exhaust ventilation), or reduce exposure to safe levels by means of administrative controls, it may be necessary to use respiratory protection.

It is the intent of this policy that, as necessary, the University of Rochester shall:
- evaluate tasks and workplaces to determine if respiratory protection is needed
- evaluate employees’ and students’ medical status before issuing respirators (and if necessary, to accommodate those employees or students who cannot wear respiratory protection for medical reasons)
- provide training on the proper selection, use, care, and limitations of respirators
- provide properly fitted respirators to any employees who may need them

No employee or student may be fitted for, issued, required to use, or use a respirator of any sort without complying fully with this document. Any employee or student wishing to use a respirator voluntarily, for comfort purposes, must do so in compliance with the voluntary use provisions of this document (see Appendix D).

Responsibilities

**Environmental Health and Safety (EH&S)**

It is the responsibility of Environmental Health and Safety to:
- maintain the University of Rochester’s written Respiratory Protection Plan
- provide assistance in evaluating tasks and workplaces where respiratory protection is required
- provide fit testing and training in cooperation with the Occupational and Environmental Medicine Program and University Health Service’s Occupational Health Unit
- periodically review and update written respiratory protection policies and procedures
- provide compliance assistance to the University community
- provide assistance in the selection of respiratory protection equipment
- provide assistance in the determination of cartridge change-out schedules
- periodically evaluate departments’ compliance with this document
Occupational and Environmental Medicine Program and University Health Service’s Occupational Health Unit

It is the responsibility of the Occupational and Environmental Medicine Program and University Health Service’s Occupational Health Unit to:

- medically evaluate and provide medical clearances to University employees and students required to use respiratory protection
- provide employees, students, and supervisors written results of the medical clearance
- recommend ways for the University to accommodate employees or students who are not medically capable of wearing respiratory protective equipment
- provide initial and annual fit testing and training in cooperation with Environmental Health and Safety
- verify training effectiveness by means of quizzes or tests of the employee’s or student’s understanding of the training materials
- maintain records of employee and student medical clearances, fit testing and training

University Administration, Directors, Managers, Principal Investigators, Patient Care Providers, Nurse Managers/Leaders, Supervisors, and Faculty/Academic Supervisors

It is the responsibility of University Administration, Directors, Managers, Principal Investigators, Patient Care Providers, Nurse Managers/Leaders, Supervisors, and Faculty/Academic Supervisors to:

- enforce all safety equipment requirements on an ongoing basis. (U of R Personnel Policy 158, II B.1)
- perform Job Hazard Analyses (JHAs) to evaluate hazards present in their employees’ or students’ tasks and/or work environments (U of R Personnel Policy 158, II. A.1)
- ensure that hazards are mitigated using the hierarchy of controls (first eliminating hazards by means of engineering controls, then limiting exposure through administrative means, and finally protecting against hazards through the use of PPE when engineering or administrative controls cannot be used) (U of R Personnel Policy 158, II A.2)
- report to EH&S any procedures or tasks that apply or are carried out in close proximity to hazardous materials, or which involve hazardous conditions that may require the use of respirators
- ensure that the employees or students who report to them are in compliance with this document, including initial and annual fit testing, medical clearance, and training. (U of R Personnel Policy 158, II A.7)
- establish site-specific procedures for the use and care and proper storage of respirators
- ensure that employees are supplied with appropriate respiratory protection equipment as determined through JHAs
- ensure that employees have access to suitable facilities, supplies and equipment for the cleaning, maintenance and storage of respiratory protection equipment
- establish record keeping guidelines for records related to this program (i.e., training records, medical clearance memos, and site-specific procedures) (U of R Personnel Policy 158, II A.7)
- designate a Responsible Person who is charged with managing their department’s compliance with the Respiratory Protection program
- provide their employees or students with training for task- and/or site-specific hazards, policies, and precautions (U of R Personnel Policy 158, II A.7)
• establish and maintain cartridge change-out schedules as appropriate and ensure that they are followed
• ensure that outdated, damaged, deficient, or otherwise unsafe equipment is repaired or properly discarded and replaced (U of R Personnel Policy 158, II A.3)
• specify appropriate respiratory protection for individual patient care situations based on the URMC Infection Prevention Manual and/or SMH Policy Manual 7.10 Hazardous Drug Agent Handling Policy

Respiratory Protection Users

It is the responsibility of respiratory protection users to:
• correctly wear proper respiratory protection for tasks, conditions, or areas that require it (U of R Personnel Policy 158, II A.2; U of R Facilities and Operations Policy 3.2, Personal Protective Equipment)
• follow site-specific procedures established by their departments
• attend training classes
• keep medical clearance appointments
• inspect respiratory protective equipment prior to each use
• store their respirator in a clean and sanitary manner, away from potential sources of contamination
• clean and disinfect their respirator regularly
• perform a negative and positive pressure fit check each time they don a respirator
• report damaged or malfunctioning equipment immediately to Supervisors/Principal Investigators
• notify their Supervisor/Principal Investigator of any conditions potentially requiring respiratory protection and/or other PPE
• be in full compliance with Appendix D of this document if using a respirator on a voluntary basis

Respirator Selection

Proper respiratory protection selection is made only after a determination has been made as to the real and/or potential exposure of employees to harmful concentrations of contaminants in the workplace atmosphere. This evaluation will be performed prior to the start of any routine or non-routine tasks requiring respirators. The following items will be considered in the selection of respirators:

• feasibility of engineering or administrative controls in lieu of PPE.
• effectiveness of the device against the substance of concern (see Appendix B of this document, which provides a list of chemicals which are not approved for use with air purifying respirators)
• estimated maximum concentration of the substance in the work area (see Appendix A of this document regarding OSHA Permissible Exposure Limits (PELs) for air contaminants)
• general environment (open shop or confined space, etc.)
• known limitations of the respiratory protective device
• comfort, fit, and worker acceptance
• the task to be performed
• other contaminants in the environment
• potential for oxygen deficiency
• a verification of the respirator’s NIOSH certification for its intended use
Some common examples of work, which may require the use of respirators, include, but are not limited to:

- asbestos abatement activities
- abrasive blasting
- cutting or melting lead or stripping lead-based paints from surfaces
- welding or burning
- painting, especially with epoxy or organic solvent coatings
- using solvents, thinners, or degreasers
- any work which generates large amounts of dust
- working in a permit-required confined space
- administering certain drugs, such as pentamidine
- work with bioaerosols such as M. tuberculosis
- other patient care activities that could aerosolize bodily fluids

Supervisors shall contact EH&S (x5-3241) well in advance of non-routine work, which may expose workers to hazardous substances or oxygen deficient atmospheres.

**No respirator may be used for any purpose if it has not been NIOSH certified for that purpose.**

**Respirators shall not be used unless in full compliance with all provisions of this document.**

**Assigned Protection Factors (APFs) for Respirators**

APFs are numbers that indicate the level of workplace respiratory protection that a respirator or class of respirators is expected to provide to employees when used as part of an effective respiratory protection program. The APF table below is provided as a guide in the selection of air purifying, powered air-purifying, supplied air (or airline respirator), and self contained breathing apparatus (SCBA) respirators.

APFs must be used to select the appropriate type of respirator based upon the exposure limit of a contaminant and the level of the contaminant in the workplace. Respirators are selected by comparing the exposure level found in the workplace and the maximum concentration of the contaminant in which a particular type of respirator can be used (the Maximum Use Concentration, or MUC). The MUC is determined by multiplying the respirator’s APF by the contaminant’s exposure limit (see Appendix A). If the workplace level of the contaminant is expected to exceed the respirator’s MUC a respirator with a higher APF must be chosen.

**Example:**

**Question:** Employees use a respirator with an Assigned Protection Factor (APF) of 10. What would the maximum use concentration be when the hazardous substance has a permissible exposure limit of 50 μg/m³?

**Answer:** 500 μg/m³. The MUC is determined by multiplying the respirator’s APF by the contaminants exposure limit. For example, if the hazardous substance is lead (with a PEL of 50 μg/m³), and the respirator used by employees has an APF of 10, then the calculated MUC is 500 μg/m³ or 0.5 mg/m³ (i.e., 50 μg/m³ x 10). If the level of the contaminant is expected to exceed the MUC, a respirator with a higher APF must be chosen.
<table>
<thead>
<tr>
<th>Type of Respirator(^1,2)</th>
<th>Quarter Mask</th>
<th>Half Mask</th>
<th>Full Face piece</th>
<th>Helmet/Hood</th>
<th>Loose-Fitting Facepiece</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-purifying respirator</td>
<td>5</td>
<td>10(^3)</td>
<td>50</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Powered Air-Purifying Respirator (PAPR)</td>
<td>----</td>
<td>50</td>
<td>1,000</td>
<td>25/1,000(^4)</td>
<td>25</td>
</tr>
<tr>
<td>Supplied-Air Respirator (SAR) or Airline Respirator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand Mode</td>
<td>----</td>
<td>10</td>
<td>50</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Continuous flow mode</td>
<td>----</td>
<td>50</td>
<td>1,000</td>
<td>25/1,000(^4)</td>
<td>25</td>
</tr>
<tr>
<td>Pressure-demand or other positive pressure mode</td>
<td>----</td>
<td>50</td>
<td>1,000</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Self-Contained Breathing Apparatus (SCBA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand Mode</td>
<td>----</td>
<td>10</td>
<td>50</td>
<td>50</td>
<td>----</td>
</tr>
<tr>
<td>Pressure-demand or other positive pressure mode (e.g., open/closed circuit)</td>
<td>----</td>
<td>----</td>
<td>10,000</td>
<td>10,000</td>
<td>----</td>
</tr>
</tbody>
</table>

Notes:
1. Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.
2. The assigned protection factors in the table are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.
3. This APF category includes filtering face pieces, and half masks with elastomeric face pieces.
4. The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.
5. These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).
Conditions which are Immediately Dangerous to Life and Health

Some circumstances may arise where it is not possible to accurately identify or estimate potential exposures. If this should occur, the task or area shall be considered Immediately Dangerous to Life and Health (IDLH). Oxygen deficient atmospheres shall also be considered IDLH. Under OSHA regulations, IDLH conditions require the use of either a full-face pressure demand self contained breathing apparatus with at least 30 minutes of air, or a full-face pressure demand supplied-air respirator with auxiliary self-contained air supply (these types of respirators are described below). Although the University does have several SCBA units, University personnel and students shall not enter IDLH atmospheres. Because auxiliary self-contained air supplies are not provided, the University’s airline respirators are not to be used in IDLH conditions.

Types of Respirators

Air-Purifying Respirator

These respirators remove air contaminants by filtering, absorbing, adsorbing, or chemically reacting with the contaminants as they pass through the respirator canister or cartridge. This type of respirator is to be used only where adequate oxygen is available and the atmosphere is not oxygen enriched (19.5 to 23.5 percent by volume). This type of respirator must not be used with chemicals described in Appendix B of this document. Air-purifying respirators can be classified as follows:

- Particulate removing respirators, which filter out dusts, fibers, fumes, mists and microorganisms. These respirators may be single-use disposable respirators or respirators with replaceable filters.

  NOTE: Surgical masks do not provide protection against air contaminants. They are never to be used in place of an air-purifying respirator. They are for medical use only, in cases where the patient must be protected from contamination from employees or visitors.

- Gas- and vapor-removing respirators, which remove specific individual contaminants or a combination of contaminants by absorption, adsorption or by chemical reaction. Gas masks and chemical-cartridge respirators are examples of gas- and vapor-removing respirators.

- Combination particulate/gas- and vapor-removing respirators, which combine the respirator characteristics of both kinds of air-purifying respirators.

- Powered air-purifying respirators (PAPR), which operate on the same principle as air-purifying respirators, but rely on a blower unit to move air through filters and deliver it to the user. They can remove particulate and/or gas/vapor contaminants depending on the type of filter they are provided with.

Supplied-Air Respirators

These respirators provide breathing air independent of the environment. Such respirators are to be used when the contaminant has poor warning properties (insufficient odor, taste or irritating warning properties), or when the contaminant is of such high concentration or toxicity
that an air-purifying respirator is inadequate. Supplied air respirators are classified as follows:

- Demand respirators, which supply air to the user on demand (inhalation), which creates a negative pressure within the facepiece. Leakage into the facepiece may occur if there is a poor seal between the respirator and the user's face.
- Pressure-Demand respirators maintain a continuous positive pressure within the facepiece, thus preventing leakage into the facepiece.
- Continuous Flow respirators maintain a continuous flow of air through the facepiece and prevent leakage into the facepiece.
- Self-contained Breathing Apparatus (SCBA) respirators allow the user complete independence from a fixed source of air and offer the greatest degree of protection, but are also the most complex respirator type. Training and practice in their use and maintenance is essential. *This type of device shall be used in emergency situations, situations which are immediately dangerous to life or health, when there is an oxygen deficient or enriched atmosphere, or when hazards cannot be adequately characterized.*

**Identification of Respirator Cartridges and Gas Mask Canisters**

Respirator cartridges and canisters are designed to protect against individual hazards or combinations of potentially hazardous atmospheric contaminants, and are specifically labeled and color-coded to indicate the type and nature of protection they provide. See appendices A and B for information on contaminant PELs and substances for which air purifying respirators must not be used.

The NIOSH approval label on the respirator will also specify the maximum concentration of contaminant(s) for which the cartridge or canister is approved. For example, a label may read:

"DO NOT WEAR IN ATMOSPHERES IMMEDIATELY DANGEROUS TO LIFE. MUST BE USED IN AREAS CONTAINING AT LEAST 20 PERCENT OXYGEN. DO NOT WEAR IN ATMOSPHERES CONTAINING MORE THAN ONE-TENTH PERCENT ORGANIC VAPORS BY VOLUME. REFER TO COMPLETE LABEL ON RESPIRATOR OR CARTRIDGE CONTAINER FOR ASSEMBLY, MAINTENANCE, AND USE."

No respirator or respirator cartridge may be used in a way that is not consistent with its labeling, manufacturers recommendations, instructions on material safety data sheets (without advice from a health and safety professional from EH&S), standard operating procedures, EH&S guidelines, or this document.

**Service Life of Air-Purifying Respirator Canisters and Cartridges**

The canisters or cartridges of air-purifying respirators are intended to be used until:

- filter resistance precludes further use
- the chemical sorbent is expended as signified by a specific warning property, e.g., odor, taste, end of service life indicator (ELSI), or
• The end of the manufacturer-recommended service life has been reached.

New canisters, cartridges or filters shall always be provided when a respirator is reissued. When in doubt about the previous use of the respirator, obtain a replacement canister or cartridge.

**Warning Signs of Respirator Failure**

**Particulate Air-Purifying**

When breathing difficulty is encountered with a particulate filter respirator (due to increased resistance with partial clogging), the filter(s) must be replaced. Disposable filter respirators must be discarded when soiled or contaminated, or when medically required for patient infection prevention considerations.

**Gas or Vapor Air-Purifying**

If, when using a gas or vapor respirator (chemical cartridge or canister), any of the warning properties are detected (e.g., odor, taste, eye irritation, or respiratory irritation), promptly leave the area and check for the following:

- proper face seal
- damaged or missing respirator parts
- saturated or inappropriate cartridge or canister
- end of service life indicator (ELSI)

If no discrepancies are observed, replace the cartridge or canister. If any of the warning properties appear again, the concentration of the contaminants may have exceeded the cartridge or canister design specification. When this occurs an airline respirator or SCBA is required.

**Supplied Air Respirator**

When using an airline respirator, leave the area immediately if the compressor fails, if an air pressure drop is sensed, or if you are signaled to exit. When using an SCBA leave the area as soon as the air pressure alarm is activated.

**Respirator Use**

Respiratory protection is authorized by the employee’s supervisor and, after medical clearance is obtained and fit testing and training are completed, issued for the following employees:

- workers in areas known to have contaminant levels requiring the use of respiratory protection or in which contaminant levels requiring the use of respiratory protection may be created without warning (e.g., emergency purposes such as hazardous material spill responses).
- workers performing operations documented to be health hazardous and those unavoidably required to be in the immediate vicinity where similar levels of contaminants are generated.
- workers in suspect areas or performing operations suspected of being health hazardous but for which adequate sampling data has not been obtained.
An employee or student may not wear respiratory protective equipment if he or she has any condition (i.e., facial hair, clothing, or hairstyle, etc.), which may interfere with the proper fit and operation of the respirator. If an employee or student requires corrective lenses, these lenses must be worn during operations involving respiratory protective equipment, and must be worn in such a way as not to interfere with the respirator’s seal or operation.

Those employees or students who would like to voluntarily wear respiratory protective devices for comfort in the absence of recognized exposure hazards may do so. However, those employees must do so in full compliance with the Voluntary Respirator Use sections of this document.

Written site- and/or task-specific standard operating procedures (SOPs) are required before employees may use respiratory protective equipment. It is the responsibility of the employee’s or student’s supervisor to develop these SOPs with the assistance of EH&S, to distribute them to his or her affected employees, and to take whatever steps are necessary to ensure that the SOPs are followed at all times.

Specific PPE and respiratory protection procedures for patient care are generated by Providers or Nurses, in accordance with the URMC Infection Prevention Manual and/or the SMH Policy Manual 7.10 Hazardous Drug Agent Handling Policy. Precautions are posted outside the patient room, and recorded in the E-Record system.

**Respirator Use in Laboratories Handling Biohazards**

Respirators for use in areas where biohazardous materials are used or stored must be selected based on a review of the laboratory procedures, protocols, biohazardous agents proposed for use, etc. The Institutional Biosafety Committee, in cooperation with EH&S, the supervisor, and the researcher, will conduct a risk assessment and determine the appropriate Biosafety Level for the laboratory and the corresponding level of personal protective equipment required.

A specific procedure for use of respiratory protection in Biosafety Level 3 facilities is available through EH&S (x5-3241).

**Voluntary (Comfort) Respirator Use**

Under some circumstances, employees or students may wish to use respiratory protection equipment for their own comfort or sense of well being, even when there is no recognized exposure hazard. In these cases, not all of OSHA’s respiratory protection requirements apply (i.e., fit testing is not required). In order to voluntarily use respiratory protective equipment in this way, the following criteria must be met:

- voluntary respirator use must be in full compliance with OSHA 29 CFR 1910.134, Appendix D.
- there is no recognized hazard or potential for over exposure
- the respirator must be NIOSH certified
- the respirator must be cleaned, stored, and maintained as specified in Care of Respiratory Protective Equipment, below
- the respiratory protective equipment must not in itself present a hazard to the user
- the employee or student must be medically cleared to use a respirator (Exception: filtering facepieces (i.e., dust masks, “duck bill” respirators, etc.) do not require a medical clearance for voluntary use, but all other conditions of Appendix D must be
the employee or student must be given a copy of Appendix D: Information for Employees using Respirators When Not Required Under the Standard

the employee or student and his/her supervisor must sign the release form contained in Appendix D of this document, acknowledging that the employee has received a copy of OSHA Appendix D, Information for Employees using Respirators When Not Required Under the Standard (Sec. 1910.134, Appendix D). The form must be kept on file in the department’s respiratory protection records.

Employees or students who would like to voluntarily wear a respirator may purchase and wear their own respirator or may ask their department to supply one for them.

Care of Respiratory Protective Equipment

In order to be effective and to properly protect the user, respirators must be regularly inspected, cleaned, and maintained. It is the responsibility of the respirator user to ensure that his or her respirator is inspected before each use, is kept in a clean and sanitary condition, is stored away from sources of contamination, is maintained properly, and that any problems with the equipment are reported immediately for repair or replacement. Disposable respirators should be discarded if they become soiled or contaminated, or at a minimum, at the end of each work shift.

Cleaning and Disinfecting

The Occupational Health and Safety Administration (OSHA) has set guidelines for the cleaning of respiratory protective equipment. These are listed below. Alternatively, respiratory protective equipment can be cleaned according to the manufacturers recommendations so long as the equipment is cleaned and disinfected in a way that does not damage it, and does not harm the user.

1. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
2. Wash components in warm (43 deg. C [110 deg. F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
4. 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 of laundry bleach to one liter of water at 43 deg. C (110 deg. F);
   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 water at 43 deg. C (110 deg. F);
   c. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
5. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in
dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

6. Components should be hand-dried with a clean lint-free cloth or air-dried.
7. Reassemble the facepiece, replacing filters, cartridges, and canisters where necessary.
8. Test the respirator to ensure that all components work properly by performing the positive and negative breathing procedure.

Storage

Respiratory protection equipment must be stored in a way that protects it from damage, dust, contamination, sunlight, chemicals, excessive moisture, and extreme temperatures. It must also be stored in such a way that it is unlikely that the facepiece or valves will be damaged or deformed. Additionally, emergency respirators must be stored in an easily accessible way in the workplace, must be in containers clearly labeled as containing emergency respirators, and according to any manufacturers recommendations. Self-contained breathing apparatus (SCBA) cylinders must be stored fully charged, and must be recharged whenever they fall below 90% full.

Inspection

The following checks are required as part of the respirator inspection procedure:

- respirator function
- tightness of connections
- condition of the facepiece, hood, head straps, valves, connecting tubes, and cartridges, canisters, or other filters
- pliability of any elastomeric parts
- signs of cracking, discoloration, or other symptoms of aging
- tank pressure (SCBAs)
- regulator and pressure alarm bell function (SCBAs)
- tank condition (SCBAs)
- PAPR air flow and battery/wiring condition

In addition, emergency respirators must be inspected by performing the checks above and certifying that they have been performed by tagging or labeling the respirator with the date of the inspection, the name and/or signature of the inspector, a serial number or other identifying means, the condition of the respirator, and any needed repairs or other maintenance.

When using respirators routinely, these inspections must be performed before each use and during each cleaning. Emergency respirators shall be checked before being brought into the workplace, and periodically thereafter, and SCBAs must be checked at least monthly. Inspection records must be kept until the time of the next inspection.

Respirators found to be defective or in need of repairs must be removed from service immediately.

Repairs

When repairing a respirator or replacing cartridges, valves or other components, only parts approved for the particular make and model of respirator shall be used. Use of other parts
may invalidate the NIOSH approval. No attempts, under any circumstances, should be made to change, modify, or improve any respiratory protection device. Only specially trained and qualified technicians shall make repairs to SCBA’s, pressure regulators, and other sensitive devices. Contact EH&S for further information.

**Service Life/Filter Change Schedules**

SCBAs are usually equipped with a warning of service life. It may be a pressure gauge or timer with audible alarm or a window indicator for canisters. The respirator user must understand the operation and limitations of each type of warning device.

Some air purifying respirator cartridges/canisters are equipped with an end-of-service-life indicators (ESLI), that warn 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 (US DOL OSHA, 1998). If no ESLI-equipped filter is available for the specific contaminant(s) of concern, a change-out schedule must be developed and implemented for canisters and cartridges based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life to prevent contaminant breakthrough (Jeffress, 1998). The Supervisor and/or EH&S shall maintain a record of the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data. Employees or students voluntarily wearing APRs regularly with organic vapor cartridges shall change the cartridges on their respirators if they detect breakthrough, i.e., odor or irritation.

The following chemicals have substance-specific standards under OSHA and cartridges must be changed accordingly:

- **Acrylonitrile** - ESLI or end of shift, whichever occurs first.
- **Benzene** - ESLI or beginning of shift, whichever occurs first.
- **Butadiene** - Every 1, 2, or 4 hours dependent on concentration and at beginning of shift.
- **Formaldehyde** - Every three hours or end of shift, whichever occurs first.
- **Vinyl chloride** - ESLI or end of shift in which they are first used, whichever occurs first.
- **Methylene chloride** - ESLI or end of shift in which they are first used, whichever occurs first.

Employees or students wearing APRs or PAPRs with P100 filters for protection against dust and other particulates shall change the cartridges on their respirators when they first begin to experience difficulty breathing (i.e., resistance) while wearing their respirators.

Developing change schedules can be a complex task. The following guidelines are provided to assist with determining change out schedules for canisters and cartridges. You may contact EH&S for assistance:

**Availability of objective data:** Determine if respirator manufacturers, industry organizations, trade associations, professional societies, chemical manufacturers, or academic institutions can provide objective data for the particular make and model of the respirator canisters/cartridges and if this data is sufficient to develop change out schedules.

**Use of inappropriate respirator cartridge/canister:** Determine if APRs are appropriate for the conditions in the workplace. Some chemicals break through canisters and cartridges so
quickly that canisters and cartridges may not be appropriate for the workplace. In this case, respirator manufacturers and material safety data sheets should be consulted for instruction.

**Change schedule for mixtures:** Chemical mixtures can present a difficult task when developing change schedules. This is best determined by experimental methods, not predictive mathematical models. Schedules should be calculated by assuming the mixture stream behaves as a pure system of the most rapidly migrating component or compound with the shortest breakthrough time, i.e., sum up the concentration of the components. A margin of safety for the user should be included.

**Chemical contaminant migration:** When organic materials with a boiling point below 65 degrees Centigrade are imbedded in a carbon filter, some may have a tendency to migrate through the sorbent material during periods of storage or when not in use. This can rapidly increase breakthrough and could present an additional exposure to the user. Whenever migration is possible, canisters and cartridges should be changed after every workshift.

**Emergency Response:** Chemical cartridges used for emergency response will be changed after each use.

**Voluntary Use:** Employees or students voluntarily wearing APRs regularly with organic vapor cartridges shall change the cartridges on their respirators as recommended by the respirator/cartridge manufacturer.

**Quality of Supplied Air (from tanks or compressors)**

Supplied air respirators provide high levels of protection, but only if the air source is free of contamination and other hazards. OSHA has issued the following requirements for the quality of supplied air, along with requirements for air supplying equipment. These requirements are:

- compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen;
- compressed breathing air shall meet at least the requirements for Type 1-Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:
  - (A) Oxygen content (v/v) of 19.5-23.5%;
  - (B) Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;
  - (C) Carbon monoxide (CO) content of 10 ppm or less;
  - (D) Carbon dioxide content of 1,000 ppm or less; and
  - (E) Lack of noticeable odor.
- compressed oxygen shall not be used in atmosphere-supplying respirators that have previously used compressed air.
- oxygen concentrations greater than 23.5% shall be used only in equipment designed for oxygen service or distribution.

For SCBAs:
- cylinders shall be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);
- cylinders of purchased breathing air must have a certificate of analysis from the supplier that the breathing air meets the requirements for Type 1--Grade D breathing air;
- the moisture content in the cylinder must not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

Compressors used to supply breathing air to respirators shall be constructed, situated, and maintained so as to:
- prevent entry of contaminated air into the air-supply system;
- minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;
- have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.
- have a tag containing the most recent sorbent bed change date and the signature of the person authorized to perform the change. The tag shall be maintained at the compressor.
- ensure that, for compressors that are not oil-lubricated, carbon monoxide levels in the breathing air shall not exceed 10 ppm.
- ensure that, for oil-lubricated compressors, a high-temperature or carbon monoxide alarm, or both, shall be used to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.
- ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing airlines.
- ensure that breathing gas containers are marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

Medical Evaluation

Using a respirator places an extra burden on an employee’s or student’s cardiopulmonary system. The respirator’s weight, breathing resistance, and tendency to trap heat can all contribute to an increased workload and increased fatigue. In order to ensure that this potential for increased exertion does not place the employee or student at medical risk, the employee or student must receive a medical evaluation and a medical clearance prior to fit testing for or the use of respiratory protective equipment (except for disposable filtering facepieces as described in the voluntary respirator use section of this document). This medical evaluation and clearance shall be performed by a physician or other qualified, licensed health care professional under the guidance and supervision of University Health Service’s (UHS) Occupational Health Unit or Strong Memorial Hospital’s Occupational and Environmental Medicine Program (OEMP). The evaluation must be performed during the employee’s normal working hours, or at a time and place convenient for the employee.

Task Information

The following information must be supplied in writing to UHS or OEMP by the employee’s or student’s supervisor, prior to the medical clearance appointment:

- the type and weight of the respirator to be used by the employee or student;
- the duration and frequency of respirator use (including use for rescue and escape);
- the expected physical work effort;
- temperature and humidity extremes that may be encountered;
- additional protective clothing and equipment to be worn; and
- any additional information requested by UHS or OEMP.

**Medical Evaluation Procedures and Questionnaire**

OSHA requires that the medical evaluation consist of a medical questionnaire, and/or a physical examination, which provides the same information as the questionnaire, and any needed follow-up medical examinations. OSHA’s mandatory medical clearance questionnaire is located in Appendix C of this document. The medical evaluation shall also include any tests, procedures, or other information that the evaluating medical professional feels is appropriate.

**Medical Determination**

Upon completion of the medical evaluation, UHS or OEMP shall provide the employee or student, and his or her supervisor with a statement of the employee’s or student’s ability or inability to wear a respirator, any limitations on respirator use due to medical or work conditions, and the need (if any) for follow-up medical evaluations. Additionally, UHS and OEMP must provide a statement that the employee has been given a copy of the medical evaluation and medical determination results.

**Additional Medical Evaluations**

Additional medical evaluations shall be scheduled when:

- the employee or student reports signs or symptoms that are related to respirator use or the ability to use a respirator
- UHS, OEMP, EH&S, or the employee’s or student’s supervisor request a re-evaluation
- observation of the employee or student indicates a need for re-evaluation
- there are changes in the workplace or task that may significantly increase the employee’s or student’s exertion while wearing a respirator (i.e., physical work changes, temperature changes, added protective clothing, etc.)

Additional medical evaluations shall consist of whatever exams, tests, or other information that the medical professional feels are necessary to evaluate the employee or student.

**Employees Who Cannot Be Medically Cleared**

For those employees who cannot be medically cleared to wear negative pressure respirators, the University shall provide the employee with a suitable powered air-purifying respirator (if available and appropriate, and if the employee can be medically cleared for its use). The University may also accommodate the employee in other ways as recommended by UHS, OEMP, EH&S, the supervisor, and representatives of Employee Relations, Personnel, and/or other employment-related University departments. Employees who perform tasks which require PAPRs, SCBAs (or other supplied air respirators) and who cannot be medically cleared shall also be accommodated according to safety, medical, personnel, and legal procedures and requirements.
Fit Testing

In order to ensure that respiratory protective equipment provides a good fit, and therefore good protection without excessive leaks, employees or students must successfully complete a fit test before any tight fitting respiratory protection equipment can be used (except on a voluntary basis). Employees or students shall be fit tested with the same model, size, and style of respirator that they will use, and shall be fit tested at least annually. Employees or students must be fit tested for every make and model of respirator they use. Employees or students shall also be fit tested whenever:

- a different size, style, or model of respirator is to be used
- there are changes in the employees physical condition that could affect the respirator seal (such as an obvious change in weight, facial scarring, dental changes, or surgeries involving the face and head)
- the employee reports a change in the fit of his or her respirator

Employees or students shall not use any respirator for which they have not been medically cleared and trained, nor shall they use any tight fitting respirator unless they have been successfully fit tested, except as permitted under the voluntary use provisions of this document (see Appendix D).

Fit testing shall be performed using one of the following OSHA approved qualitative or quantitative fit test methods:

- Isoamyl Acetate (banana oil) vapor*
- Saccharin Solution Aerosol*
- Denatonium Benzoate (Bitrex ™) Solution Aerosol*
- Irritant Smoke (Stannic Chloride)*
- Generated Aerosol
- Ambient Aerosol Condensation Nuclei Counter (PortaCount ™)
- Controlled Negative Pressure

Qualitative Fit Testing
Those methods above that are marked with an asterisk are qualitative methods. These methods rely on the subject’s response (taste, smell, cough, etc.) to a challenge agent to determine whether an adequate fit can be achieved. Qualitative fit test methods shall not be used when a fit factor of 100 or greater is required.

Sensitivity testing for the challenge agent must be conducted before qualitative fit testing is performed. If the challenge agent cannot be detected by the employee or student being fit tested, an alternative agent must be selected.

Quantitative Fit Testing
Quantitative fit test methods (i.e., generated aerosol, ambient aerosol condensation nuclei counter, and controlled negative pressure) must indicate a fit factor of at least 100 for half-face respirators, and at least 500 for full-face respirators to be considered successful.

Tight fitting supplied air respirators shall be fit tested by temporarily converting them to negative pressure respirators.
**User Fit Checks**

The employee or student shall perform a check of the respirator’s seal every time the respirator is donned. The respirator user must check his or her seal by performing both positive and negative seal checks. To perform a positive seal check, close off the exhalation valve and exhale gently into the facepiece. The fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most cartridge respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test. To perform a negative seal check, close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

**Note: Positive and negative pressure fit checks are not a valid substitute for formal fit testing.**

If these seal checks cannot be performed successfully, the employee or student shall inspect the respirator and ensure that any needed repairs are made. If the respirator still does not fit properly and there is no obvious respirator defect, the employee or student must be retested for a proper fit before the respirator can be used.

**Training**

In order to provide adequate protection, employees and students must be trained on the proper use and care of respiratory protective equipment. This training shall be given before initial use and at least annually thereafter and shall include the following points:

- why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- the limitations and capabilities of the respirator;
- how to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;
- how to inspect, put on and remove, use, and check the seals of the respirator;
- procedures for maintenance and storage of the respirator;
- how to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and
- the general requirements of this section.

The University shall ensure that employees and students can demonstrate their knowledge of these areas by use of a competency test. Employees or students who do not pass this test shall be retrained, and may not use respiratory protective equipment or perform tasks that require it until they successfully complete the exam. Tests are administered by UHS and OEM during the initial respirator clearance procedure, and thereafter as part of the annual health updates/fit testing, mandatory lab safety training, SMH annual mandatory in-services, and/or spill response/respirator training.

Employees and students shall be retrained whenever there are changes in the workplace or
task that make previous training obsolete, it becomes apparent that the employee’s knowledge of respiratory protection is inadequate, and when any other situation arises that indicates a need for retraining.

Initial general safety and PPE training is provided by EH&S at New Hire Orientation. Documentation of the initial training is maintained in the HRMS system.

Initial respirator training is provided by UHS or OEM as part of the initial medical evaluation and fit testing. UHS and OEM also provide annual refresher training for all personnel for whom they perform fit testing. The refresher training materials can be found at [http://www.safety.rochester.edu/ih/respiratoryprotection/pdf/GeneralRespiratoryProtectionTraining.pdf](http://www.safety.rochester.edu/ih/respiratoryprotection/pdf/GeneralRespiratoryProtectionTraining.pdf) and must be studied prior to the fit test appointment. A written examination is administered before the fit test.

Research laboratory personnel receive basic annual respirator training as part of their mandatory annual lab safety training. Individual departments are required to provide annual site- and/or task-specific training to their personnel.

Clinical laboratory personnel receive basic annual respirator training as part of their mandatory annual lab safety training. Individual departments are required to provide annual site- and/or task-specific training to their personnel.

Annual training for the Spill Response Team, Pest Control, and the Hazardous Waste Management Unit is conducted by EH&S; training records for these personnel are maintained by EH&S.

General PPE training for Facilities personnel is provided by EH&S as part of the annual mandatory safety training. Site- or task-specific training for these personnel is provided by Facilities supervisors.

Environmental Services provides annual training and maintains those training records for all Environmental/Building Services workers. Additional training is provided annually as part of the medical clearance and fit testing process by OEM, which maintains those records.

Annual training for medical care providers, nurses, patient care personnel, medical students, Infectious Disease Project Nurses, Security, Vivarium, and all other personnel is provided by UHS or OEM as part of the annual health update process. Associated records are maintained by UHS and OEM.

**Record Keeping**

UHS, OEM and EH&S retain written information regarding medical evaluations, fit testing, and the University of Rochester Respiratory Protection Program.

Records of medical evaluations are retained by OEM and UHS and made available in accordance with 29 CFR 1910.1020.

Established records of qualitative and quantitative fit tests are retained by UHS, OEM and EH&S and include:

1. The name or identification of the employee tested;
2. Type of fit test performed;
3. Specific make, model, style and size of respirator tested;
4. Date of test;
5. The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

These records are retained for respirator users until the next fit test is administered.

Initial fit test records for all employees are maintained by UHS and OEM.

EH&S maintains annual fit test records for the Spill Response Team, Pest Control, and the Hazardous Waste Management Unit.

Initial and annual fit test records for all other employees, including Facilities, Environmental/Building Services, laboratory, Physicians/Providers, Nurses and other medical personnel, medical students, Infectious Disease Project Nurses, Security, and Vivarium personnel, are maintained by OEM and UHS.

Training records for the Spill Response Team, Pest Control, and the Hazardous Waste Management Unit are maintained by EH&S.

General PPE training records for Facilities personnel are maintained by Facilities Administration. Site- or task-specific training records are maintained by Facilities supervisors.

Environmental Services maintains internal training records for all Environmental/Building Services workers.

Training records for research laboratory personnel are required to be sent to EH&S. EH&S personnel enter the records into HRMS where they are maintained. Individual departments are required to maintain records for annual site- and/or task-specific training provided to their personnel.

Training records for clinical laboratory personnel are entered directly into HRMS via the Blackboard training system. Individual departments are required to maintain records for annual site- and/or task-specific training provided to their personnel.

Annual training records for medical care providers, nurses, patient care personnel, medical students, Infectious Disease Project Nurses, Security, Vivarium, and all other personnel are maintained by UHS or OEM.

UHS and OEM maintain training records for personnel for whom they provide fit testing.

A written copy of the University of Rochester’s Respiratory Protection Program can be obtained from EH&S, UHS or OEM.

**Respiratory Protection for M. tuberculosis**

Appendix A, OSHA Limits for Air Contaminants

1910.1000 TABLE Z-1 - TABLE Z-1 Limits for Air Contaminants.


1910.1000 TABLE Z-2 - TABLE Z-2


1910.1000 TABLE Z-3 - TABLE Z-3 Mineral Dusts

Appendix B, Chemicals Which Are Not Approved For Use With Air-purifying Respirators

Following is a partial list of materials for which air purifying respirators shall not be used regardless of concentration or duration of exposure. Contact your respirator’s manufacturer or EH&S for more information.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Odor Threshold (PPM)</th>
<th>TLV (PPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsine</td>
<td>.21</td>
<td>.05</td>
</tr>
<tr>
<td>Chloroform</td>
<td>.2</td>
<td>.1</td>
</tr>
<tr>
<td>Dimethylsulfate</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Hydrogen Selenide</td>
<td>11.2</td>
<td>10</td>
</tr>
<tr>
<td>Methyl Chloride</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Nitric Acid</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Phosgene</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Stibine</td>
<td>46.8</td>
<td>10</td>
</tr>
<tr>
<td>Acrolein</td>
<td>21.4</td>
<td>2</td>
</tr>
<tr>
<td>Allyl alcohol</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Crotonaldehyde</td>
<td>7.32</td>
<td>2</td>
</tr>
<tr>
<td>Cyclohexanol</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Dichloroethyl ether</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Dimethyl acetaladime</td>
<td>46.8</td>
<td>10</td>
</tr>
<tr>
<td>Epichlorhydrin</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Hydrogen selenide</td>
<td>.3</td>
<td>.05</td>
</tr>
<tr>
<td>Isopropyl glycidyl ether (IGE)</td>
<td>300</td>
<td>50</td>
</tr>
<tr>
<td>Methyl chloroform</td>
<td>500</td>
<td>50</td>
</tr>
<tr>
<td>Styrene monomer</td>
<td>200</td>
<td>50</td>
</tr>
</tbody>
</table>

Chemicals Whose TLVs Are Close To Or Less Than Their Odor Thresholds

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Odor Threshold (PPM)</th>
<th>TLV (PPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2 Dichloroethylene</td>
<td>500</td>
<td>20</td>
</tr>
<tr>
<td>Acrolein</td>
<td>.21</td>
<td>.1</td>
</tr>
<tr>
<td>Acrylonitrile</td>
<td>21.4</td>
<td>2</td>
</tr>
<tr>
<td>Allyl alcohol</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Crotonaldehyde</td>
<td>7.32</td>
<td>2</td>
</tr>
<tr>
<td>Cyclohexanol</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Dichloroethyl ether</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Dimethyl acetaladime</td>
<td>46.8</td>
<td>10</td>
</tr>
<tr>
<td>Epichlorhydrin</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Hydrogen selenide</td>
<td>.3</td>
<td>.05</td>
</tr>
</tbody>
</table>

Odor Thresholds From 2 To 10 Times The TLV

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Odor Threshold (PPM)</th>
<th>TLV (PPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrolein</td>
<td>.21</td>
<td>.1</td>
</tr>
<tr>
<td>Acrylonitrile</td>
<td>21.4</td>
<td>2</td>
</tr>
<tr>
<td>Allyl alcohol</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Crotonaldehyde</td>
<td>7.32</td>
<td>2</td>
</tr>
<tr>
<td>Cyclohexanol</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Dichloroethyl ether</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Dimethyl acetaladime</td>
<td>46.8</td>
<td>10</td>
</tr>
<tr>
<td>Epichlorhydrin</td>
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<td>2</td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Hydrogen selenide</td>
<td>.3</td>
<td>.05</td>
</tr>
<tr>
<td>Isopropyl glycidyl ether (IGE)</td>
<td>300</td>
<td>50</td>
</tr>
<tr>
<td>Methyl chloroform</td>
<td>500</td>
<td>50</td>
</tr>
<tr>
<td>Styrene monomer</td>
<td>200</td>
<td>50</td>
</tr>
</tbody>
</table>
### Odor Thresholds Equal To Or Greater Than 10 Times The TLV

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Odor Threshold (PPM)</th>
<th>TLV (PPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>α-Chloroacetophenone</td>
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<td>.054</td>
</tr>
<tr>
<td>Bromoform</td>
<td>530</td>
<td>.5</td>
</tr>
<tr>
<td>Camphor (synthetic)</td>
<td>1.6-200</td>
<td>2</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>75</td>
<td>5</td>
</tr>
<tr>
<td>Chloroform</td>
<td>200</td>
<td>10</td>
</tr>
<tr>
<td>Chlorpicrin</td>
<td>1.08</td>
<td>.1</td>
</tr>
<tr>
<td>Diglycidyl ether (DGE)</td>
<td>5</td>
<td>.1</td>
</tr>
<tr>
<td>Dimethylformamide</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>Ethylene oxide</td>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>Methanol</td>
<td>2000</td>
<td>200</td>
</tr>
<tr>
<td>Methyl cyclohexanol</td>
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<td>50</td>
</tr>
<tr>
<td>Methyl formate</td>
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<td>100</td>
</tr>
<tr>
<td>Phosgene</td>
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<td>.1</td>
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<tr>
<td>Toluene 1,4, diisocyanate (TDI)</td>
<td>2.14</td>
<td>.005</td>
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Appendix C, OSHA’s Mandatory Medical Clearance Questionnaire

UNIVERSITY OF ROCHESTER
UNIVERSITY HEALTH SERVICE

RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

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

To the employee:

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

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

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle “yes” or “no”).

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you ever had any of the following conditions?
   a. Seizures (fits): Yes/No
   b. Diabetes (sugar disease): Yes/No
   c. Allergic reactions that interfere with your breathing: Yes/No
   d. Claustrophobia (fear of closed-in places): Yes/No
   e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?
   a. Asbestosis: Yes/No
   b. Asthma: Yes/No
   c. Chronic bronchitis: Yes/No
   d. Emphysema: Yes/No
   e. Pneumonia: Yes/No
   f. Tuberculosis: Yes/No
   g. Silicosis: Yes/No
   h. Pneumothorax (collapsed lung): Yes/No
   i. Lung cancer: Yes/No
   j. Broken ribs: Yes/No
   k. Any chest injuries or surgeries: Yes/No
   l. Any other lung problem that you've been told about: Yes/No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
   a. Shortness of breath: Yes/No
   b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
   c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
   d. Have to stop for breath when walking at your own pace on level ground: Yes/No
   e. Shortness of breath when washing or dressing yourself: Yes/No
   f. Shortness of breath that interferes with your job: Yes/No
   g. Coughing that produces phlegm (thick sputum): Yes/No
   h. Coughing that wakes you early in the morning: Yes/No
   i. Coughing that occurs mostly when you are lying down: Yes/No
   j. Coughing up blood in the last month: Yes/No
   k. Wheezing: Yes/No
   l. Wheezing that interferes with your job: Yes/No
   m. Chest pain when you breathe deeply: Yes/No
   n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you ever had any of the following cardiovascular or heart problems?
   a. Heart attack: Yes/No
   b. Stroke: Yes/No
   c. Angina: Yes/No
   d. Heart failure: Yes/No
   e. Swelling in your legs or feet (not caused by walking): Yes/No
   f. Heart arrhythmia (heart beating irregularly): Yes/No
   g. High blood pressure: Yes/No
   h. Any other heart problem that you've been told about: Yes/No
6. Have you ever had any of the following cardiovascular or heart symptoms?
   a. Frequent pain or tightness in your chest: Yes/No
   b. Pain or tightness in your chest during physical activity: Yes/No
   c. Pain or tightness in your chest that interferes with your job: Yes/No
   d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
   e. Heartburn or indigestion that is not related to eating: Yes/No
   f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you currently take medication for any of the following problems?
   a. Breathing or lung problems: Yes/No
   b. Heart trouble: Yes/No
   c. Blood pressure: Yes/No
   d. Seizures (fits): Yes/No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)
   a. Eye irritation: Yes/No
   b. Skin allergies or rashes: Yes/No
   c. Anxiety: Yes/No
   d. General weakness or fatigue: Yes/No
   e. Any other problem that interferes with your use of a respirator: Yes/No

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

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

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

11. Do you currently have any of the following vision problems?
    a. Wear contact lenses: Yes/No
    b. Wear glasses: Yes/No
    c. Color blind: Yes/No
    d. Any other eye or vision problem: Yes/No

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

13. Do you currently have any of the following hearing problems?
    a. Difficulty hearing: Yes/No
    b. Wear a hearing aid: Yes/No
    c. Any other hearing or ear problem: Yes/No

14. Have you ever had a back injury: Yes/No

15. Do you currently have any of the following musculoskeletal problems?
    a. Weakness in any of your arms, hands, legs, or feet: Yes/No
    b. Back pain: Yes/No
    c. Difficulty fully moving your arms and legs: Yes/No
    d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
    e. Difficulty fully moving your head up or down: Yes/No
    f. Difficulty fully moving your head side to side: Yes/No
    g. Difficulty bending at your knees: Yes/No
Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No
   If “yes,” do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No
   If “yes,” name the chemicals if you know them: ________________________________________________

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:
   a. Asbestos: Yes/No
   b. Silica (e.g., in sandblasting): Yes/No
   c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
   d. Beryllium: Yes/No
   e. Aluminum: Yes/No
   f. Coal (for example, mining): Yes/No
   g. Iron: Yes/No
   h. Tin: Yes/No
   i. Dusty environments: Yes/No
   j. Any other hazardous exposures: Yes/No If “yes,” describe these exposures ________________________________________________________________

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

5. List your previous occupations: _________________________________________________________

6. List your current and previous hobbies: ___________________________________________________

7. Have you been in the military services? Yes/No If “yes,” were you exposed to biological or chemical agents (either in training or combat): Yes/No

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

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No If “yes,” name the medications if you know them: ____________________________________________

10. Will you be using any of the following items with your respirator(s)?
    a. HEPA Filters: Yes/No
    b. Canisters (for example, gas masks): Yes/No
    c. Cartridges: Yes/No
11. How often are you expected to use the respirator(s) (circle “yes” or “no” for all answers that apply to you)?:
   a. Escape only (no rescue): Yes/No
   b. Emergency rescue only: Yes/No
   c. Less than 5 hours per week: Yes/No
   d. Less than 2 hours per day: Yes/No
   e. 2 to 4 hours per day: Yes/No
   f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:
   a. Light (less than 200 kcal per hour): Yes/No
      (Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing) while operating a drill press (1-3 lbs.) or controlling machines. If “yes,” how long does this period last during the average shift: ____________hrs. ____________mins.
   b. Moderate (200 to 350 kcal per hour): Yes/No
      (Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.) If “yes,” how long does this period last during the average shift: ____________hrs. ____________mins.
   c. Heavy (above 350 kcal per hour): Yes/No
      (Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.). If “yes,” how long does this period last during the average shift: ____________hrs. ____________mins.

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No If “yes,” describe this protective clothing and/or equipment:

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

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases)

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):
   Name of the first toxic substance: ____________________________
   Estimated maximum exposure level per shift: ____________________________
   Duration of exposure per shift: ____________________________
   Name of the second toxic substance: ____________________________
Estimated maximum exposure level per shift: ________________________________
Duration of exposure per shift: ________________________________________

Name of the third toxic substance: ______________________________________
Estimated maximum exposure level per shift: ______________________________
Duration of exposure per shift: ________________________________________

The name of any other toxic substances that you’ll be exposed to while using your respirator: ______
_____________________________________________________________________

19. Describe any special responsibilities you’ll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security): ________________________________
_____________________________________________________________________
_____________________________________________________________________

Employee’s Signature: _________________________________________________

For UHS Use Only:


Appendix D, Information and Acknowledgement Form for Employees or students using Respirators When Not Required Under the OSHA Standard Sec. 29 CFR 1910.134, Appendix D

You have indicated that you wish to voluntarily wear a respiratory protection device. The following information is required by OSHA to be supplied to employees who wish to use respiratory protection devices voluntarily. Please read this information and sign the form to indicate that you have received this information:

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.
4. Voluntary respirator use is permitted in non-hazardous atmospheres only.
5. Keep track of your respirator so that you do not mistakenly use someone else’s respirator.

I acknowledge that I have read the University’s Respiratory Protection Program including the section on Voluntary (Comfort) Respirator Use, and have received a copy of the information for voluntary use of respirators when not required under the Standard Sec. 1910.134. I have discussed these documents with my supervisor, have received medical clearance to wear a respirator, and am in compliance with the University Respiratory Protection Program. I will receive a signed copy of this document from my supervisor for my records.

Employee Name: ____________________________________________

Signature: _________________________________________   Date: ___________

Supervisor Signature: __________________________________  Date: __________

This document must be kept on file in the user’s department respiratory protection records.