University of Rochester
Respiratory Protection Program

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Scope
This policy covers any University employee who, in the course of their duties, may perform work in areas where recognized or anticipated respiratory hazards are present.

Examples of recognized hazards include, but are not limited to chemical exposures, biological exposures, and airborne debris that could be inhaled. Personal protective equipment shall not be relied upon when there are feasible engineering and/or administrative controls available that can provide protection equal to or greater than that offered by personal protective equipment.

Introduction
Many substances may be harmful if inhaled. Examples include some wood dusts, chemical powders, mists from water-based chemical sprays, gaseous chemicals, fumes from welding galvanized steel, vapors from cleaning solvents, or aerosolized 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 to reduce exposure to safe levels by means of administrative controls, it may be necessary to use respiratory protection.

It is the intent of this program that the University of Rochester shall:

- Evaluate tasks and workplaces to determine if respiratory protection is needed;
- Evaluate employees’ medical status before issuing respirators (and when necessary, to accommodate those employees 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; and,
- Perform any other tasks necessary to comply with OSHA’s 29 CFR 1910.134, Respiratory Protection Standard (Appendix E).

No employee may be fitted for, issued, required to use, or use a respirator of any sort without complying fully with this document.

Any employee 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 on page 34).

Responsibilities
The Occupational Safety Unit of Environmental Health and Safety

It is the responsibility of the Occupational Safety Unit to:

- Maintain the University of Rochester’s written Respiratory Protection Program;
- Provide assistance in evaluating tasks and workplaces where respiratory protection is or may be required;
- Provide fit testing and training in cooperation with the SMH Employee Health Program and University Health Service’s Occupational Health Unit;
- Periodically review and update the written respiratory protection program 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;
• Review plans for any new non-medical respiratory protection applications to ensure appropriate protection is provided and regulatory compliance is maintained; and,
• Periodically evaluate departments’ compliance with this document.

**Strong Memorial Hospital Employee Health Program and University Health Service (UHS)**

It is the responsibility of the SMH Employee Health Program and University Health Service to:

• Medically evaluate and provide documentation of medical clearances to University employees required to use respiratory protection;
• Provide employees and supervisors with written results of the medical clearance;
• Recommend ways for the University to accommodate employees who are not medically capable of wearing respiratory protective equipment;
• Provide initial and annual fit testing and training in cooperation with EH&S Occupational Safety;
• Ensure employees have been medically cleared and trained prior to being fit tested;
• Validate training effectiveness by means of written quizzes, tests, or examinations; and,
• Maintain records of employee medical clearance, fit testing and training.

**University Respiratory Protection Program Coordinators (RPCs)**

It is the responsibility of the Respiratory Protection Program Coordinators to:

• Maintain a list of respirator users in their area(s);
• Ensure that new employees/users in their areas are medically cleared, trained (both general and area-specific), and fit tested as required prior to using respirators;
• Ensure that respirator users in their areas receive annual medical clearance, training and fit testing as required;
• Ensure that a hazard assessment is conducted, and that the respirator(s) used are appropriate to address the hazard condition(s) present. Note: In the case of voluntary (comfort) use, the hazard assessment must still be conducted to ensure that no respiratory hazards are present (see requirements for Voluntary use on page 14 of this document).
• Maintain respirator clearance, training and use records for the users in their area(s):
  • Local procedures, SOPs (Standard Operating Procedures) or JHAs (Job Hazard Assessments)
  • Respirator selection documentation
  • Voluntary use documentation (Appendix D)
  • Cartridge change-out schedules
• Note: University Human Resources identifies all staff with job responsibilities that may involve patient contact as participants in the Respiratory Protection Program. In patient care areas, respiratory protection is utilized when “airborne precautions” are put in place. The local department does not maintain specific SOPs, but follows hospital policies for infection prevention. Records related to medical clearance and fit-testing for medical staff are maintained by UHS and SMH Employee Health Program.
• Maintain required inventory of masks, cartridges and other related equipment;
• Act as a resource to answer questions for the respirator users in their area(s);
• Act as the communications contact between area respirator users and EH&S Respiratory Protection Program Management;
• Work with EH&S to ensure proper cartridge change-out schedules are developed and followed;
• Maintain local worksite-specific procedures (EH&S can assist in drafting);
• Work with EH&S on Respiratory Protection Program audits and evaluations.
• Attend RPC trainings and meetings as required by EH&S.

**University Human Resources Business Partners**

It is the responsibility of the University Business Partners to:

- Determine training needs for each employee/group of employees that use, or will use, respirators in the workplace; and,
- Arrange for and ensure that required training is delivered to employees who use, or will use, respirators in the workplace.

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

It is the responsibility of University Administration, Directors, Managers, Principal Investigators, Patient Care Providers, Nurse Managers/Leaders, and 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’ 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 Occupational Safety any procedures or tasks that employ or are carried out in close proximity to hazardous materials, or which involve other hazardous conditions that may require the use of respirators;
- Inform EH&S Occupational Safety of any plans for new non-medical applications of respiratory protection equipment;
- Ensure that the employees who report to them are in compliance with this document, and Federal OSHA Regulations, including initial and annual fit testing, medical clearance, and training. (29 CFR 1910.134 and U of R Personnel Policy 158, II A.7);
- Establish site/area-specific procedures for the use, 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 (Respiratory Protection Coordinator) who is charged with managing their department’s compliance with the Respiratory Protection program, notify EHS of the designee’s identity, and provide EHS with updated information whenever there is a change of the designee;
- Provide their employees with training for task- and/or site/area-specific hazards, policies, and precautions (U of R Personnel Policy 158, II A.7);
- Work with EH&S to establish and maintain cartridge change-out schedules as appropriate and ensure that they are followed;
- Ensure that employees receive equipment-specific training on the maintenance, donning/doffing, and use of the respiratory protection equipment they will be using.
- Ensure that outdated, damaged, deficient, or otherwise unsafe equipment is immediately removed from service and 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; and,
- Co-operate with Occupational Safety to provide requested information for periodic audits of the University Respiratory Programs.

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);
- Follow site-specific procedures established by their departments;
- Attend training classes and/or complete any required training programs;
- Keep medical clearance appointments;
- Inspect respiratory protective equipment prior to each use;
- Store respirators in a safe, clean and sanitary manner, away from potential sources of contamination and in a way that will prevent damage;
- Clean and disinfect re-usable respirators regularly;
- Perform negative and positive pressure fit checks 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; and,
- 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 Respiratory Protection Coordinator for the area in which the personnel who will be using the respiratory protection work is
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, including the anticipated workload;
Other contaminants in the environment;
Potential for oxygen deficiency;
Other PPE that may be required; and,
Verification of the respirator’s NIOSH certification for its intended use.

Some common examples of work that 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 Pentamadine;
- Working with bioaerosols containing or potentially containing infectious agents such as M. tuberculosis; and/or,
- 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 for which it has not been NIOSH certified.

Respirators shall not be used unless in full compliance with all provisions of this document and 29 CFR 1910.134.

**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...
A 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.

### Assigned Protection Factors

<table>
<thead>
<tr>
<th>Type of Respirator</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 Resipator (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>10</td>
<td>50</td>
<td>50</td>
<td>----</td>
</tr>
<tr>
<td>Demand Mode</td>
<td>----</td>
<td>----</td>
<td>10,000</td>
<td>10,000</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 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 (Workplace Protection Factor) or SWPF (Simulated Workplace Protection Factor) 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 purposes. 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 that are Immediately Dangerous to Life and Health

Some circumstances may arise where it is not possible to accurately identify or estimate potential chemical 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.

UNIVERSITY EMPLOYEES ARE NOT PERMITTED TO ENTER IDLH ATMOSPHERES.

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.

Because auxiliary self-contained air supplies are not provided, the University's airline respirators must not be used in IDLH conditions. SCBAs are the only respirators at the University that are certified for use in IDLH conditions; however, such use is not permitted.

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 (within the range of 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 (e.g. filtering facepieces) or respirators with replaceable filters;

  NOTE: Surgical masks are not classified as respirators and 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.

  NOTE: Single-strap dust masks are classified as respirators, but are not NIOSH approved, and may not be used for respiratory protection; they are only to be used for non-toxic nuisance dusts.

- Gas- and vapor-removing respirators, which remove specific individual contaminants or a combination of contaminants by absorption, adsorption or 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
other 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 minimizing leakage into the facepiece;

- **Continuous Flow respirators** maintain a constant flow of air through the facepiece which minimizes leakage into the facepiece;

- **Airline respirators**, which provide the user with clean air by means of a hose fed by a compressor located outside of the contaminated area. Airline respirators may be equipped with tight fitting face pieces or with loose fitting headpieces or hoods.

- **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. While this type of device is present at the University, and is commonly 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), **University employees are not permitted to enter or work in areas containing IDLH conditions.**

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

Respirator cartridges and canisters are designed to protect against individual or combinations of potentially hazardous atmospheric contaminants, and are specifically labeled and color-coded to indicate the type 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 cartridge or canister 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.**"
No respirator or respirator cartridge may be used in a way that is inconsistent with its labeling, manufacturers recommendations, instructions on 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 (ESLI); or,
- The end of the recommended service life has been reached.

If there is no ESLI-equipped cartridge appropriate for the conditions in the workplace, the manager of the affected employees must work with EH&S to implement an effective change schedule that will ensure cartridges are changed before the end of their service life, as required by CFR 1910.134(d)(3)(i)(B).

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

Warning Signs of Respirator Failure

If you suspect your respirator has become damaged during use, or that it is malfunctioning, immediately leave the contaminated area. Once outside, inspect it to ensure it is functioning properly before re-entering the contaminated space. If it is not functioning properly, replace it with a properly working respirator before re-entry. Ensure that the damaged respirator is removed from service immediately, labelled as not usable, and is repaired or discarded.

Particulate Air-Purifying

When breathing difficulty is encountered with a particulate filter respirator (due to increased resistance resulting from partial clogging), the filter(s) must be replaced. Disposable filter (e.g. filtering facepiece) respirators must be discarded when wet, soiled or contaminated, or when medically required by 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 contaminated area and check for the following:
Proper face seal;
• Damaged or missing respirator parts;
• Saturated or inappropriate cartridge or canister; or,
• End of service life indicator (ESLI).

If no deficiencies 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 contaminated 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 contaminated area as soon as the air pressure alarm is activated.

**Respirator Use**

Respiratory protection must be 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 hazards and those unavoidably required to be in the immediate vicinity where similar levels of contaminants are generated; and/or,
• Workers in suspect areas or performing operations suspected of being health hazards but for which adequate sampling data has not been obtained.

An employee 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 requires corrective lenses, these lenses must be worn during operations involving respiratory protective equipment, and must be worn in such a way as to not interfere with the respirator’s seal or operation.

Respiratory protection equipment must be donned in an area free of contamination and must be worn at all times while in the contaminated area. Any adjustments to the equipment that might compromise the seal of tight-fitting face pieces or the air flow of PAPRs, airline respirators, or SCBAs must not be performed while the user is in the contaminated area.

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 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.

**Voluntary (Comfort) Respirator Use**

Under some circumstances, employees may wish to use respiratory protection equipment for their own comfort or sense of wellbeing, 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, all of the following criteria must be met:

- Those employees 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 (see Appendix D, page 35). It is the responsibility of the Respiratory Protection Coordinator for the employee’s area to ensure that the hazards are assessed before voluntary use is permitted.
- Voluntary respirator use must be in full compliance with OSHA 29 CFR 1910.134, Appendix D;
- There is no recognized hazard or potential for overexposure;
- 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;
- Note for respirators other than the disposable N-95 type, such as elastomeric half-face or full-face masks that use a cartridge or Powered Air Purifying respirators (PAPRs), the employee who wishes to use such a mask or PAPR must be medically cleared to do so. The Respiratory Protection Coordinator for the employee’s area is responsible for ensuring this is done.
- The employee 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 met.);
- The employee must be given a copy of Appendix D: Information for Employees using Respirators When Not Required Under the Standard; and,
- The employee and his/her supervisor must sign the release form contained in Appendix D (page 35) 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.
Those employees 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.

If an Industrial Hygienist requires a respirator to be worn in a particular area, even when airborne contaminants are determined to be below Permissible Exposure Limits (PELs) or other recognized exposure limits, respirator use would not be considered voluntary.

Employees who voluntarily use non-disposable respirators must be provided with time and facilities needed to clean, disinfect, maintain, and store those respirators.

**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 Safety and Health 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 manufacturer’s recommendations as 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 and replace or repair any defective parts.
2. Wash components in warm (43 deg. C. or 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. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following: 1.) Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C. or 110 deg. F. or 2.) 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. or 110 deg. F. or 3.) Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
3. Rinse components thoroughly in clean, warm (43 deg. C. or 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.

4. Components should be hand-dried with a clean lint-free cloth or air-dried.

5. Reassemble the facepiece, replacing filters, cartridges, and canisters where necessary.

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 a manner that prevents damage to or deformation of the facepiece or valves. Additionally, emergency respirators must be stored according to any manufacturer’s recommendations in an easily accessible way in the workplace, and must be in containers clearly labeled as containing emergency respirators. 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 or headpiece, head straps, valves, connecting tubes, and cartridges, canisters, or other filters;
- Pliability of any elastomeric parts;
- Signs of cracking, discoloration, or other signs of aging;
- Tank pressure (SCBAs);
- Regulator and pressure alarm bell function (SCBAs);
- Tank condition (SCBAs);
- PAPR airflow 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 will 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 SCBAs, 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 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 the 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 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** - At the beginning of the shift and every 1, 2, or 4 hours thereafter, depending on concentration.
- **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.

Employees 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 the canisters and cartridges may not be appropriate for the workplace. In this case, respirator manufacturers and 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 work shift.

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

Voluntary Use: Employees 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 non-respirable worksite air or other gas systems and no asphyxiating substance shall be introduced into breathing airlines; and,
- 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 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 at medical risk, the employee 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 Employee Health Program. 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 SMH Employee Health by the employee’s supervisor, prior to the employee’s medical clearance:

- The type and weight of the respirator to be used by the employee;
- 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 SMH Employee Health.

**Medical Evaluation Procedures and Questionnaire**

Prior to fit testing or respirator use, OSHA requires the potential user be medically evaluated by a Physician or other Licensed Health Care Professional (PLHCP). The medical evaluation must 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 (page 29) of this document. The medical evaluation shall also include any tests, procedures, or other information that the evaluating PLHCP feels are appropriate.

**Medical Determination**

Upon completion of the medical evaluation, UHS or SMH Employee Health shall provide the employee, and his or her supervisor with a statement of the employee’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 SMH Employee Health 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 reports signs or symptoms that are related to respirator use or the employee’s ability to use a respirator;
- UHS, SMH Employee Health, EH&S, or the employee’s supervisor requests a re-evaluation;
- Observation of the employee indicates a need for re-evaluation; and/or,
- There are changes in the workplace or task that may significantly increase the employee’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 the PLHCP feels are necessary to evaluate the employee.
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 (PAPR), 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, SMH Employee Health, 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 must successfully complete a fit test before any tight fitting respiratory protection equipment can be used (except on a voluntary basis). Employees 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 must be fit tested for each and every make and model of respirator they use. Employees 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); and/or,
- The employee reports a change in the fit of his or her respirator.

Employees 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, page 35).

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

The methods above that are marked with an asterisk are qualitative methods and rely on the employee’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 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 Seal Checks**

The employee shall perform a check of the respirator’s seal every time he or she dons the respirator. 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 replace 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 seal checks are not a valid or legal substitute for formal fit testing.**

If these seal checks cannot be performed successfully, the employee 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 must be re-tested for a proper fit before the respirator can be used.

**If both positive and negative pressure seal checks cannot be successfully completed, the employee must not use that respirator.**

**Training**

In order to provide adequate protection, employees 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;
- 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 can demonstrate their knowledge of these areas by use of a competency test. Employees 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. Training and tests are administered via MyPath or by UHS and SMH Employee Health 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, spill response/respirator training.

Employees shall be re-trained at least annually, whenever there are changes in the workplace or task that make previous training obsolete, if 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.

Respirator training is provided via MyPath or by UHS or SMH Employee Health as part of the initial medical evaluation and fit testing. UHS and SMH Employee Health also provide annual refresher training for all personnel for whom they perform fit testing. Refresher training may be completed via MyPath.

When training has been completed via MyPath, UHS or SMH Employee Health shall require documentation of training completion prior to conducting fit testing.

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 SMH Employee Health, which maintains those records.

Annual training for medical care providers, nurses, patient care personnel, medical students, Infectious Disease Project Nurses, Public Safety, Vivarium, and all other personnel is provided via MyPath or by UHS or SMH Employee Health as part of the annual health update process. Associated records are maintained by UHS and SMH Employee Health or in the MyPath system.

**Record Keeping**

UHS, SMH Employee Health 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 SMH Employee Health and UHS and made available in accordance with 29 CFR 1910.1020.

Established records of qualitative and quantitative fit tests are retained by UHS, SMH Employee Health 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; and,
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.

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, Public Safety, and Vivarium personnel, are maintained by SMH Employee Health and UHS.

Training records for the Spill Response Team, Pest Control, and Environmental Compliance are maintained by EH&S.

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

Environmental Services maintains internal training records for all URMC/SMD Environmental Services workers.

Training records for clinical laboratory personnel are entered directly into MyPath via the
MyPath 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, Public Safety, Vivarium, and all other personnel are maintained by UHS or SMH Employee Health.

Records for personnel trained via MyPath are maintained in the MyPath System.

UHS and SMH Employee Health maintain training records for personnel for whom they provide training.

A written copy of the University of Rochester’s Respirator Protection Program can be obtained from EH&S, UHS or SMH Employee Health.

**Respiratory Protection Program Audit & Evaluation**

OSHA requires that employers conduct evaluations of the workplace as necessary to ensure proper implementation of the program and consult with employees to ensure proper use.

Respiratory Protection Program Coordinators shall work with EH&S to conduct annual audits of the University’s Respiratory Protection Program. The primary tool used to evaluate the program is the Respiratory Protection Program Evaluation Form, found in Appendix H of this document.

**Respiratory Protection for *M. tuberculosis***

Respiratory protection for employees who enter rooms in which patients with known or suspected infectious *M. tuberculosis* (TB) are being isolated is covered under OSHA standard 29 CFR 1910.134. Specific requirements and procedures are covered in the URMC/SMH Infection Prevention Manual, Appendix K: Tuberculosis Respiratory Protection Program, which can be found at: [https://urmc-smh.policystat.com/policy/3703299/latest/#autoid-qe4q2](https://urmc-smh.policystat.com/policy/3703299/latest/#autoid-qe4q2)
Appendix A, OSHA Limits for Air Contaminants

1910.1000 TABLE Z-1: Limits for Air Contaminants.

https://www.osha.gov/laws-regds/regulations/standardnumber/1910/1910.1000TABLEZ1

1910.1000 TABLE Z-2


1910.1000 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>Chloriform</td>
<td>1,2</td>
<td>300</td>
</tr>
<tr>
<td>Dimethylsulfate</td>
<td>11.2</td>
<td>10</td>
</tr>
<tr>
<td>Hydrogen Selenide</td>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>Methyl Chloride</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Nitric Acid</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>21.4</td>
<td>2</td>
</tr>
<tr>
<td>Phosgene</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Stibine</td>
<td>200</td>
<td>200</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>Arsenic</td>
<td>2.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Cylohexane</td>
<td>30</td>
<td>300</td>
</tr>
<tr>
<td>Ethylene diamine</td>
<td>11.2</td>
<td>10</td>
</tr>
<tr>
<td>Methyl acetate</td>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>Methylamine</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Propyl alcohol</td>
<td>200</td>
<td>200</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>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 acetamide</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>
## 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>
<td>1.34</td>
<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>
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<td>10</td>
</tr>
<tr>
<td>Chloropicrin</td>
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</tr>
<tr>
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<td>Dimethylformamide</td>
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<td>10</td>
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<tr>
<td>Ethylene oxide</td>
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<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>
<td>2000</td>
<td>100</td>
</tr>
<tr>
<td>Phosgene</td>
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<td>.1</td>
</tr>
<tr>
<td>Toluene 1,4, diisocyanate (TDI)</td>
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<td>.005</td>
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</table>
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.


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
h. Difficulty squatting to the ground: Yes/No
i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
j. Any other muscle or skeletal problem that interferes with using a respirator: 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: ________________________________
Appendix D, Information and Acknowledgement Form for Employees 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, of 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. Wear the respirator in non-hazardous areas only (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, if required, 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.

Appendix F, Other University Policies or Programs Incorporating Respiratory Protection

Strong Memorial Hospital Policy 7.10, Hazardous Drug Agent Handling Policy

Strong Memorial Hospital Policy 15.2, Clinical Laser Safety Policy

Strong Memorial Hospital Infection Prevention Manual
   2.3 Protective Attire for Universal Blood and Body Fluid Precautions
   3.3 Initiating Isolation Precautions
   3.5 Protective Attire for Isolation

Strong Memorial Hospital Tuberculosis Control Program

Strong Memorial Hospital Tuberculosis Respiratory Protection Program (Appendix K)

University of Rochester Chemical Hygiene Program

University of Rochester Confined Space Program

University of Rochester Formaldehyde Program

University of Rochester Hazard Communication Programs (General and for Nurses and Medical Care Staff)

University of Rochester Job Hazard Assessment Program

University of Rochester Laser Safety Program for Research Laboratories

University of Rochester Mold and Water-Damaged Building Materials Management Policy

University of Rochester Nanomaterials Safety Program

University of Rochester Personal Protective Equipment Plan

University of Rochester Personnel Policy 158: Safety or Personal Protective Equipment

University of Rochester Radiation Safety Manual
Appendix G-University of Rochester Faculty Handbook Statement of Safety Policy

Per University of Rochester Faculty Handbook, Statement of Safety Policy (III.M.Safety):

It is the policy of the University of Rochester to provide an environment in which recognized hazards that could cause injury or illness to faculty, staff, students, patients, or visitors are controlled and monitored, and to protect its facilities from risk of damage from unsafe acts or conditions. The safety and well-being of all persons on University property or engaged in University activities are of primary concern. Each member of the University community, including each member of the faculty, is expected to share this concern and to participate in University efforts to encourage safety and control risk in all activities. It is each person’s responsibility to be alert to actual or potential hazards and to take appropriate steps to control them.
Appendix H-Respiratory Protection Program Evaluation Form

University of Rochester
RESPIRATOR PROGRAM ASSESSMENT CHECKLIST

RPC Name: _____________________________________ *RPC – Respiratory Protection Coordinator
Department: _____________________________________
Division: _____________________________________
Date of Assessment: _________________________________
Respirator Program Location(s): ________________________
Number of people in this respirator program: ______________
Types of Respirator(s) Used:
 Filtering face piece (includes dust mask, N-95, P99, etc.)
 Cartridge (half or full face)  Powered Air Purifying (PAPR)
 Airline  SCBA

1 Program Management/Documentation
1.1 Does the RPC have a current list showing the names of all respirator users? ❑ ❑ N/A
1.2 Are up-to-date SOPs in place covering all tasks that use a respirator? ❑ ❑
1.3 Do SOPs, JHAs or local department procedures:
1.3.1 Address facial hair, prescription lenses, and other conditions that interfere with fit? ❑ ❑
Covered in the UR Respiratory Protection Program document
1.3.2 Contain disposal information for cartridges, dust masks, etc.? ❑ ❑
1.3.3 Contain local storage information? ❑ ❑
1.3.4 Contain inspection, cleaning and disinfection procedures? ❑ ❑
1.3.5 Cover limitations of use? ❑ ❑
1.3.6 Address voluntary use situations?
Voluntary respirator use must be in full compliance with OSHA 29 CFR 1910.134, Appendix D
1.4 Are SOPs / local procedures readily available to users? ❑ ❑
1.5 Are the manufacturers’ instructions (or equivalent) for all department respiratory equipment readily available to users? ❑ ❑
1.6 Are procedures in place to ensure all contract labor employees (non-employees being supervised by UR) who are using respirators, have up to date medical clearance, training and fit testing? ❑ ❑ ❑

2 Respirator Selection
2.1 Has the respirator selection for each use been discussed with UR Environmental, Health & Safety? ❑ ❑
2.2 Is documentation of respirator selection available? ❑ ❑
2.3 Have cartridge change out schedules been established and documented for all tasks using cartridge respirators without end-of-service-life indicators (ESLI)? ❑ ❑ ❑

3 Medical Evaluation/Fit Testing
3.1 Do all users have up to date medical clearance? ❑ ❑
3.2 Have all users of tight fitting respirators been fit tested in the last 12 months? ☐ ☐ ☐

4 **RPC and Respirator User Training**
4.1 Has the RPC attended Initial RPC Training? ☐ ☐
4.2 Have all respirator users received department-specific respirator training? This may include review of SOPs, JHA’s, procedures or formal training. ☐ ☐

5 **Maintenance of Respirators**
5.1 Are single use respirators (dust mask, N-95, etc.), discarded after use? ☐ ☐ ☐
5.2 Are shared respirators cleaned and disinfected before use by another person? ☐ ☐ ☐
5.3 Are respirators, issued to individuals, periodically inspected by properly trained personnel? ☐ ☐ ☐
5.4 Is respirator equipment stored in an area that is clean, avoids temperature extremes, free of damaging chemicals, excessive moisture, out of direct sunlight and prevents deformity of the face piece? ☐ ☐

6 **Portable Compressor/Cylinder Use**
6.1 If portable compressors are used, is there a written procedure for the use and maintenance? ☐ ☐ ☐
6.2 Has the portable compressor undergone periodic preventative maintenance and inspection? ☐ ☐ ☐
6.3 Are certificates of breathing air quality in cylinders available while the cylinder is being used? ☐ ☐ ☐

8 **Respiratory Protection Program Feedback**

____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
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____________________________________________________________________________________________
____________________________________________________________________________________________
References

Code of Federal Regulations:

- 29 CFR 1910.134: Respiratory Protection Standard:  
- 29 CFR 1910.1020: Access to Employee Exposure and Medical Records:  
- 42 CFR part 84: Approval of Respiratory Protective Devices (NIOSH):  
  http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=c9c15fd462ffe5c4f4e85b73f161b2e0&r=PART&n=42y1.0.1.7.67
- 49 CFR part 173: Shippers—General Requirements for Shipments and Packagings:  
  http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfr173_main_02.tpl
- 49 CFR part 178: Specifications for Packagings:  
  http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title49/49cfr178_main_02.tpl

U of R Personnel Policy 158: Safety or Personal Protective Equipment:  
http://www.rochester.edu/working/hr/policies/pdfpolicies/158.pdf

U of R Faculty Handbook (III.M.): Safety:  
http://www.rochester.edu/provost/assets/PDFs/Faculty_handbook.pdf

URMC/SMH Infection Prevention Manual, Appendix K: Tuberculosis Respiratory Protection Program:  

SMH Policy Manual 7.10 Hazardous Drug Agent Handling Policy:  
http://intranet.urmc-sh.rochester.edu/policy/smhpolicies/section07/7-10.PDF

ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989:  