

Selection, Use and Care of Respirators

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PURPOSE

The purpose of this document is to provide a framework for the protection of workers who are required — or choose — to wear respiratory protection when engineering or work practice controls are not feasible, reasonable or sufficient. While the University of Ottawa endeavours to eliminate or reduce hazards to the extent possible through a hierarchy of hazard controls, we recognize that there may be cases where respiratory protection is required.

This document details the procedures to select respirators, fit test workers with respiratory protection equipment, and use and care for respirators. The decision to provide respiratory protection should not be made lightly — other avenues such as elimination or substitution of the material, engineering controls or work practices should be tried first. Respiratory protection should only be instituted following a thorough risk assessment of documented complaints, potential over-exposure or stated requirements concerning the material in question.

For additional information, refer to the [Ontario Health and Safety Act](#) and regulations, as well as the *CSA Standard Z94.4-18 – Selection, Use and Care of Respirators*. The CSA Standard is available online by [creating a CSA Communities account](#) or in hard copy from the Office of Risk Management.

SCOPE

This document applies to all workers who are required — or voluntarily choose — to wear respiratory protection during their employment or research tenure. Note that the term “worker,” which is used in this document, also refers to faculty members, support staff, students, visitors and other persons, as applicable.

This document does not cover mouthpiece or quarter-mask respirators, which are generally not used at the University of Ottawa. Additionally, use of hazard-specific respirators (e.g., bioaerosols and radiological materials) requires further consultation with your supervisor; health, safety and risk manager; or the Office of Risk Management.

DEFINITIONS

For a complete list of applicable definitions, refer to *CSA Z94.4-18 – Selection, Use and Care of Respirators*.

Bioaerosol — a liquid droplet or a solid particle suspended in the air that is living or originates from living organisms. Bioaerosols include living or dead microorganisms, fragments, toxins and particulate waste products from all varieties of living things. They are capable of causing infection or adverse or allergic response and range in size from submicroscopic particles (< 0.01 µm) to particles greater than 100 µm in diameter.

Clinical Placement Risk Management (CPRM) team — works in conjunction with the applicable faculties to implement the student clinical placement requirements.

Competent person — a person who

- Is qualified because of knowledge, training and experience to organize the work and its performance.
- Is familiar with the OH&S Act and the regulations applying to the work.
- Has knowledge of any potential or actual danger to health or safety in the workplace.

Fit factor — a quantitative measurement of the fit of a particular respirator for a particular individual.

Fit test — the use of a qualitative or quantitative method to evaluate the fit of a specific make, model and size of respirator for an individual.

Health, safety and risk manager (HSRM) — a dedicated staff member providing full-time support on risk, environment and health and safety issues in a faculty or service.

Health and Wellness office — the University Human Resources sector dedicated to promoting worker health and well-being. All interactions with the office are confidential to the extent required by law.

Immediately dangerous to life and health (IDLH) — an atmospheric concentration of any toxic, corrosive or asphyxiating substance that could be an immediate threat to life, cause irreversible or delayed adverse health effects or interfere with an individual's ability to escape from a dangerous atmosphere.

Occupational exposure limit (OEL) — established values restricting the length of time a worker is permitted to be exposed to airborne concentrations of hazardous biological or chemical agents.

Office of Risk Management — the University office promoting a safe, healthy and environmentally responsible workplace for the University community and supporting uOttawa's teaching and research mission.

Qualitative fit test (QLFT) — a pass/fail test that relies on the subject's sensory response to a challenge agent to assess the adequacy of a respirator fit.

Quantitative fit test (QNFT) — a test that uses an instrument to assess the amount of leakage into the respirator to assess the adequacy of a respirator fit.

Respirator

- **Air purifying** — a respirator with an air-purifying filter, cartridge or canister that removes specific air contaminants by passing ambient air through the air-purifying element. An N95 is an example of an air purifying respirator.
- **Atmosphere supplying** — a respirator that supplies the user with breathing air or gas from a source independent of the ambient atmosphere.
- **Tight-fitting** — a respirator designed to form a complete seal with the face or neck. Tight-fitting respirators include a half-facepiece, elastomeric and filtering-facepiece respirators, a full-facepiece and hoods equipped with a tight-fitting seal.

Seal check — the action conducted by the respirator user following a successful fit test and prior to each use of a tight-fitting elastomeric facepiece respirator to determine if the respirator is properly worn. A seal check is not applicable to N95 respirators.

Supervisor — a person who has charge of a workplace or authority over a worker or another person. Depending on the workplace relationship, a supervisor may include, for example, the

president, vice-presidents, directors, deans, managers or principle investigators. Being a supervisor does not depend on job title. It depends on whether the person is responsible for a location (for example, an office or laboratory) where the work is performed, on a paid or unpaid basis, or whether the person gives direction to complete the work performed by workers, students, visitors, volunteers or learners.

Worker — any of the following (including, for purposes of this document, graduate students):

- A person who performs work or supplies services for monetary compensation.
- A secondary school student who performs work or supplies services for no monetary compensation under a work experience program authorized by the student's school board.
- A person who performs work or supplies services for no monetary compensation under a program approved by a college of applied arts and technology, university or other postsecondary institution.
- Such other persons as may be prescribed who perform work or supply services to an employer for no monetary compensation.

PROGRAM STANDARD

All respirators and fit testing procedures must be in accordance with the *CSA Standard Z94.4-11 – Selection, Use, and Care of Respirators*, or the equivalent (e.g., U.S. standards), which sets out requirements for proper respirator selection, fit testing procedures, and respirator use and care.

Respiratory protection program components

The basic components of a respiratory protection program include:

- Roles and responsibilities of the applicable workplace parties;
- Hazard assessment;
- Selection of appropriate respirators;
- Respirator fit testing;
- Appropriate maintenance procedures (cleaning, inspection, storage, etc.);
- Health surveillance protocols;
- Training of respirator users;
- Program evaluation;
- Record retention.

All of these components must be included in the program.

ROLES AND RESPONSIBILITIES

In addition to the responsibilities of workplace parties outlined in [Procedure 14-1 — Internal Responsibilities Procedure for Health and Safety Issues](#) under [Policy 77 — Occupational Health and Safety](#), respiratory protection involves these additional responsibilities:

Workers

- Understand limitations of respiratory protection (typically through respirator use training);
- Undergo appropriate fit testing prior to first wearing respiratory protection and regularly thereafter;

- Inspect the respirator and associated components prior to each use in accordance with training and manufacturer’s recommendations;
- Report any damage to the respirator to their supervisor and remove the respirator from service;
- Be clean shaven, or have facial hair permitting a CSA-compliant seal;
- Perform seal checks after donning the respirator;
- Wear respiratory protection at all times when performing tasks or working in areas requiring respiratory protection;
- Clean, maintain and store respirators in accordance with training and manufacturer’s recommendations;
- Report any change in physical or psychological condition that could limit their ability to wear a respirator to the Health and Wellness.

Supervisors

- Identify situations where respiratory protection might be required due to the nature of the activity;
- Ensure that a hierarchy of hazard control options (e.g., elimination, substitution, engineering controls) has been duly considered prior to employing respiratory equipment;
- Conduct assessments for respiratory hazards within their work area(s) of responsibility;
- Determine appropriate respiratory protection;
- Refer prospective respirator users to the Health and Wellness office for health screening and fit testing;
- Provide workers with appropriate respiratory protection;
- Ensure that respirator users have received appropriate respirator training;
- Provide appropriate storage means and locations for reusable respiratory protection;
- Ensure that workers wear respiratory protection when required to do so;
- Revisit hazard assessment regularly and no less than annually.

Health, safety and risk managers (HSRMs)

Working within their faculty or service:

- Assist supervisors in identifying respiratory hazards;
- Assist supervisors in conducting hazard assessments;
- Assist supervisors in selecting appropriate respiratory protection;
- Provide supervisors with assistance implementing this program;
- Conduct periodic audits of the respiratory protection program within their faculty or service.

Office of Risk Management

- Maintain respiratory protection documentation in conjunction with the relevant faculties or services;
- Provide guidance in hazard identification and risk assessment process, as required;
- Assist in selecting appropriate respiratory protection as required;
- Conduct periodic audits of the respiratory protection program;

Clinical Placement Risk Management

- Be knowledgeable regarding the health effects of respiratory hazard exposure;
- Be knowledgeable regarding the physiological and psychological stress associated with the use of respiratory protection;
- Assess prospective respirator users to verify that they can use the respirator safely;
- Determine if users are medically fit to wear a respirator;
- Arrange for fit testing appointments for prospective respiratory users;
- Reassess users every two years, or more frequently as necessary (e.g., in the event of physiological or psychological changes);
- Maintain records of respirator users' fit tests.

Health and Wellness office

- Be knowledgeable regarding the health effects of respiratory hazard exposure;
- Be knowledgeable regarding the physiological and psychological stress associated with the use of respiratory protection;
- Assess prospective respirator users to verify that they can use the respirator safely;
- Determine if users are medically fit to wear a respirator;
- Arrange for fit testing appointments for prospective respiratory users;
- Reassess users every two years, or more frequently as necessary (e.g., in the event of physiological or psychological changes);
- Maintain records of respirator users' fit tests.

HAZARD ASSESSMENT

Hazard assessment must be performed by a competent person, and documented and reviewed as often as necessary.

The initial assessment should be completed by the direct supervisor of the worker or workplace. If assistance is required, the supervisor should consult with the health, safety and risk manager.

Here are the components of hazard assessment for non-bioaerosol hazards, bioaerosol hazards and combined hazards:

- **Identify contaminants in the workplace.**
 - Note: Account for work area design, release of contaminants through routine / non-routine operations, inadvertent exposure, storage and handling of materials, emergency repairs, etc.
- **Identify physical states of airborne contaminants.**
 - Note: Includes gas, vapour and particulate.
- **Measure (or estimate) concentration of contaminants.**
 - Note: Estimate airborne contaminants through air sampling, mathematical modelling or a competent person experienced with similar circumstances and/or materials.
- **Determine if the atmosphere is or may become oxygen-deficient.**
 - Note: For example, through displacement agents such as inert gases or other processes. A deficient atmosphere contains less than 19.5% oxygen.

- **Identify established occupational exposure limit (OEL) for each airborne contaminant identified.**
 - Note: Occupational exposure limits for individual materials are available in [Regulation 833 — Control of Exposure to Biological or Chemical Agents](#) and the ACGIH Threshold Limit Values (TLVs), or from the health, safety and risk manager.
- **Determine if an IDLH (immediately dangerous to life and health) atmosphere is present.**
 - Note: IDLH values are found in the [NIOSH 2005-149 Pocket Guide to Chemical Hazards](#), available from the Centers for Disease Control (CDC). IDLH atmospheres include:
 - Untested confined spaces;
 - Areas where a known hazardous contaminant is present at or above published IDLH concentration;
 - Areas where a known hazardous contaminant is present at unknown concentration;
 - Areas where reduced oxygen concentration could produce hypoxia;
 - Areas deemed as having an IDLH atmosphere by a competent person.
- **Determine if there is a specific regulation or substance-specific standard for the contaminant.**
 - Note: Consult the [regulations on asbestos containing materials](#) and the [regulations on designated substances](#), which have work-related requirements.
- **Determine (for particulate hazards) if there is oil present in the workplace.**
 - Note: The presence of oil will affect the choice of respiratory protection. If you are unsure, assume it is present. Use of air compressor systems with oil lubricators is one operation known to produce airborne oil concentrations.
- **Determine if the contaminant can be absorbed through, or is irritating to, the skin or eyes.**
 - Note: Full-face respiratory protection might be required to protect the respirator user.

A re-assessment must be conducted when the nature of the hazard changes. The work area supervisor must maintain all hazard assessments and reassess on a regular basis (not less than annually) to ensure that the proper type of respiratory protection is selected and used. A [hazard assessment template](#) is included in Appendix 1.

Bioaerosol hazard assessment

For situations involving bioaerosol atmospheric hazards, the respiratory hazard assessment must follow the criteria in section 7.3.2 of *CSA Z94.4-18 — Selection, Use and Care of Respirators*.

Radiological hazard assessment

For more information on the use of respiratory protection with radiological materials, [email the risk management specialist — radiation](#) at the Office of Risk Management.

Combined hazard assessment

For situations involving combined hazards, the respiratory hazard assessment must include all available criteria.

USE OF RESPIRATORS

Approved respiratory protection is required under the following conditions:

- When working with hazardous materials that may expose the worker to gas, vapour, dust, particulates, fumes, mists, etc.;
- When a safety data sheet recommends a respirator;
- When working in the immediate vicinity of the potential exposure area, even when not working with a hazardous substance;
- When a hierarchy of controls is insufficient to adequately protect a worker.

Respirators are only effective when there is a proper, tight seal between the skin and the respirator. This includes ensuring that the following materials do not interfere with the seal:

- Eyeglass side arms;
- Hair (including facial hair);
- Clothes;
- Dentures;
- Straps;
- Jewellery;
- Other obstructions.

The area of the face where the respirator seals to the skin must be clean-shaven. Annex P of *CSA Z94.4 — Selection, Use and Care of Respirators* provides illustrations of acceptable and unacceptable facial hair for tight-fitting respirators. **The best choice is to maintain and enforce a clean-shaven policy for personnel using a respirator; however, those who require respiratory protection and wish to maintain facial hair must have acceptable facial hairstyles in accordance with Annex P.** Certain accommodations may be required on a case-by-case basis.

Seal check

A user must check the seal of the respirator immediately after donning it and periodically during use, by positive and negative pressure checks. If an effective seal to the skin cannot be achieved for any reason, the respirator must not be worn and the user must not enter the hazardous area. If the protection afforded by the respirator becomes doubtful during use, the user must immediately exit the hazardous area and inform the supervisor. **A seal check is not a substitute for a fit test.**

To conduct a negative pressure seal check: The user covers the cartridges with the hands, inhales gently, slightly collapses the facepiece and holds his or her breath for 10 seconds. If the facepiece remains slightly collapsed and no leakage is detected, the respirator fits properly.

To conduct a positive pressure seal check: The user covers the exhalation valve with the hand and exhales gently into the facepiece. If a slight positive pressure builds up inside the facepiece without any evidence of leakage, the respirator fits properly.

RESPIRATOR SELECTION

The two types of respirators at the University of Ottawa include:

- Air-purifying respirators (powered and non-powered) — either mechanical or chemical. Mechanical filters remove contaminants in the air by filtering out particulates (e.g., fumes or mists). Chemical cartridge filters purify air by adsorbing or neutralizing gases or vapours on a

sorbent (adsorbing material) in a cartridge. They are tight-fitting and are available in half and full face models. This is the most common, tight-fitting respirator in use at uOttawa.

- N95 respirators are a type of particulate-filtering respirator. It should be noted that a N95 does not provide protection from gases or vapours, rather it filters 95% of airborne particles. N95 respirators cannot be cleaned and are therefore disposable.
- Atmosphere supplying respirators — supply users with breathable air. They must comply with *CSA Z180.1 — Compressed Breathing Air and Systems*. This respirator is only used if an air-purifying respirator is not feasible.

Supervisors must assess the hazards associated with each task and location. If hazards cannot be eliminated or controlled through a hierarchy of hazard controls — or if supplemental protection is required — appropriate respiratory protection (and other personal protective equipment, where applicable) must be implemented. Personal protective equipment does not remove the hazard and is the last line of defence.

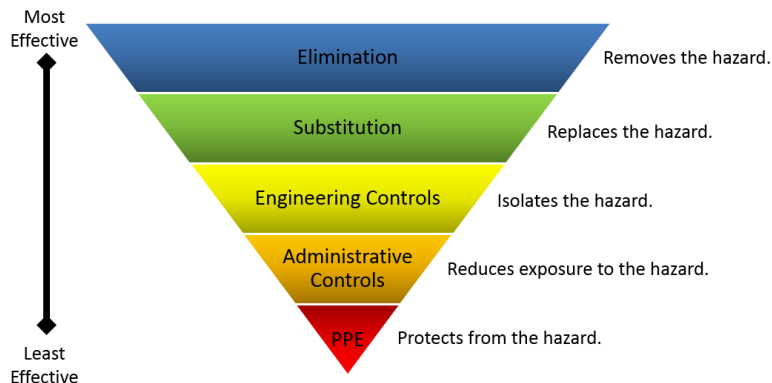


Figure 1: Hierarchy of hazard control

Hazard-specific materials

Workers require respiratory protection against certain hazards irrespective of the hazard control. For example, respiratory protection is required for most asbestos-related work, as prescribed in [Table 2 of Regulation 278/05](#). For more information on management of asbestos, refer to the [uOttawa Asbestos Management Program](#).

Respirator characteristics and limitations

Air-purifying respirators

Ambient air passes through filtering media (a cartridge or canister) that removes particles, vapours, gases or a combination of these contaminants prior to being inhaled by the user. This respirator cannot be used in an IDLH environment. The appropriate filter medium (where applicable) for the hazards must be selected.

The period for which the filter media protects the users is contingent on a number of variables, including the filter medium, the concentration of the contaminant, humidity levels and the user's respiratory rate. **A filter change-out schedule must be established, unless the filter medium is equipped with an end-of-life indicator.** Cartridges are available for a variety of potential hazards. They must meet the requirements of the respirator to provide protection (i.e., same manufacturer for respirator and cartridges).

Air-purifying respirators are available in two types:

- Non-powered (APR) — operated via the user’s breathing action. Users must not wait for breakthrough or saturation of the filtering medium; filter change-out schedules are required.
- Powered air-purifying respirators (PAPR) — contain a small, portable blower unit that users carry on their person. The blower unit passes ambient air through the air-purifying medium. Powered respirators are equipped with a loose-fitting facepiece, helmet or hood. They are limited by the battery life of the blower unit.

Atmosphere supplying respirators

Atmosphere-supplying respirators provide breathing air that is independent of surrounding conditions. The volume of breathing air limits the duration of use; actual service is generally less than the rated service time. After each use, thorough cleaning and sanitizing of the respirator must be conducted in accordance with the manufacturer’s instructions.

Atmosphere-supplying respirators are not common on campus and they do not protect exposed skin from airborne contaminants (e.g. ammonia).

FIT TESTING

The purpose of a respirator fit test — qualitative or quantitative — is to verify the user’s ability to obtain an effective seal and acceptably comfortable fit with the selected respirator. It also confirms whether a respirator user has the required skills to don and doff the respirator, perform respirator inspections and conduct a seal check.

Workers must never be assigned work or use a respirator prior to undergoing a satisfactory fit test.

Fit testing procedure

Persons requiring respiratory protection should be referred to the appropriate sector. Prospective respirator users should have access to the hazard assessment conducted by their supervisor. For a diagram of this process, see Appendix 2. Where possible, group sessions can be arranged to accommodate a large number of respirator users.

Workers

1. The supervisor refers a worker requiring a fit test to the Health and Wellness office. The worker’s request should include a completed hazard assessment. Assistance in completing a hazard assessments is available from the Health, Safety and Risk Manager.
2. The Health and Wellness office conducts broad respirator screening for pre-existing health conditions that may affect use of a respirator. If this is successful, the office proceeds to the pre-screening and fit test.
 - If the screening processes indicate potential concern with the worker’s fitness to wear a respirator, the fit test process ceases and the worker is referred for further medical consultation outside uOttawa. Results of this consultation determine if the worker has accommodation needs that restrict the use of a respirator. The University is informed of the results (e.g., the worker is fit to wear a respirator, or is not fit to wear a respirator). If the worker is fit for respirator use, the fit test proceeds.

3. The worker is referred for a fit test. Health and Wellness maintains a service agreement with a local, external fit test service provider. If the fit test is for a N95 respirator, it is recommended to bring more than one N95 respirator, just in case the first test fails and needs to be repeated.
4. The external service provider conducts the pre-screening and fit test on the appropriate respirator and provides a fit test confirmation to the Health and Wellness office.
5. Information on the worker's successful fit test is maintained by the Health and Wellness office. The worker should provide a copy of the fit test confirmation to his or her supervisor for their records.
6. The worker undergoes fit testing at required intervals, so long as respiratory protection remains a work requirement.
7. The worker's faculty or service pays the cost of the fit test.

Students on Clinical Placement

Consult the Clinical Placement Risk Management office for the [fit testing process](#).

Students

This process covers students conducting research as part of their academic requirements or conducting unpaid work with a researcher.

1. Student is referred to the [health, safety and risk manager](#). The student's request should include a completed hazard assessment. The health, safety and risk manager reviews the hazard assessment.
2. The student is referred for a fit test to a local provider.
3. The external service provider conducts the pre-screening and fit test on the appropriate respirator and provides a fit test confirmation to the student.
4. The student should provide a copy of the fit test confirmation to his or her supervisor.
5. The student undergoes fit testing at required intervals, so long as respiratory protection remains a requirement for his or her activities.
6. The faculty, service and/or student pays the cost of the fit test.

Pre-screening

All workers who request a respirator or are required by a supervisor to wear one must be pre-screened and, if potential concerns are raised, undergo further medical assessment prior to fit testing and/or using a respirator. An example of the information included as part of a pre-screening process is available in Annex E of *CSA Z94.4-18 – Selection, Use and Care of Respirators* and Appendix 3. The pre-screening process ensures that the worker is physically and psychologically fit to perform work while using the respirator.

After the worker passes the pre-screening, Health and Wellness coordinates the fit testing. Information required as part of the pre-screening or subsequent medical assessment is confidential and must not be shared with the worker's faculty or service.

Fit testing considerations

During the fit test, users are shown how the respirator is properly positioned on the face, how to adjust the strap tension and how to determine a proper respirator fit. It should be noted that this is for fitting purposes, not training for the respirator usage. A mirror should be available during the

respirator selection to help evaluate the fit. The respirator should be worn for a short period (five to 10 minutes) to assess user comfort. The assessment of the respirator fit must consider the following:

- Proper placement on the chin;
- Positioning and fit of the mask on the nose (for a half facepiece);
- Strap tension (and adjustments);
- Compatibility with other protective equipment (such as protective eyewear, hearing protection or hard hat) so that the respirator seal is not affected;
- Ability to speak without affecting the respirator seal;
- Respirator slippage;
- Self-observation in the mirror.

The respirator will not provide the needed protection if the seal between the skin and the facepiece is broken or insufficient. A seal may be insufficient if the worker has:

- Facial hair at the sealing points;
- Facial scarring;
- Long side burns;
- Glasses;
- A dermatological condition (e.g., acne);
- Other regular personal effects or accessories (e.g., dentures).

Users should undergo the fit testing under the same personal conditions that would apply when using the respirator. This includes having the same hairstyle, and using regular items such as protective equipment, dentures and eyeglasses, lotions, or creams. A fit test that does not replicate normal working conditions cannot ensure that the respirator is fitted properly.

The fit test —qualitative or quantitative — determines whether a user obtains an effective seal. It must be performed by a competent person. A user seal check **is not an appropriate substitute** for a qualitative or quantitative fit test. A facepiece must not be forced to fit a respirator user.

Fit testing must be conducted in accordance with *CSA Z94.4 – Selection, Use and Care of Respirators*, in the following circumstances:

- After the respirator pre-screening (and when necessary, further medical assessment) but prior to the user first wearing a respirator;
- When changes to the user’s physical condition could affect respirator fit (e.g., significant weight gain or loss, dental changes, facial surgery or other major physiological changes);
- When additional personal protective equipment is introduced that could affect the fit;
- When there is a change in respirator facepiece (e.g., different brand, different model or size);
- If the user reports discomfort or difficulty completing work.

Note: Regardless of the above circumstances, **fit testing must take place at least every two years that the respirator is in use.**

Qualitative fit test

A qualitative fit test involves exposing the user to a challenge agent (typically an irritant) while wearing respiratory protection. If the user detects the challenge agent, the fit is not adequate. Different respiratory protection can be tried, and the entire fit testing procedure repeated. If the person undergoing the fit test does not detect the challenge agent, the respirator is fitted properly.

A qualitative fit test can be performed with a variety of test agents, including isoamyl acetate, saccharin solution aerosol, bitter aerosol (denatonium benzoate) or irritant smoke (stannic chloride). The choice of test agent depends on the type of mask. The procedures for qualitatively fit testing the respirator must be in accordance with Annex B of *CSA Z94.4 — Selection, Use and Care of Respirators*.

Note: Users should not chew gum or tobacco, smoke, eat or drink anything other than plain water for 30 minutes prior to a qualitative fit testing, to make sure that they can detect the fit test agents by smell or taste.

The person conducting the fit test should provide the respirator user with an outline of the procedure that will follow, including:

- Explanation of the importance of using respiratory protection;
- Description of how to select a properly fitted and comfortable respirator;
- Explanation that the user must wear other personal protective equipment (as during normal operations) during the fit test;
- Explanation of the importance of pre-use inspection;
- Demonstration by the user of the donning process, in accordance with the manufacturer's instructions;
- Explanation of the seal check process and performance of it by the user;
- Explanation of the qualitative fit test process, its purpose and the importance of maintaining a seal between the respirator and the user's skin;;
- Description of the currently-equipped cartridges (where applicable);
- Description of the challenge agent and how to identify it;
- Description of the exercises to be performed during the test.

Quantitative fit test

A quantitative fit test is designed to detect any leak. It is used for oxygen-deficient and toxic environments. The procedure is similar to the qualitative fit test, where a challenge agent is presented to the user. If the agent is detected by the user, the fit is not adequate.

A quantitative fit test can be performed with non-hazardous test aerosols (such as corn oil or polyethylene glycol) in a test chamber, quantifying fit via measurement devices. The procedures for quantitatively fit testing the respirator must be in accordance with Annex C of *CSA Z94.4 — Selection, Use and Care of Respirators*.

Note: Users should not chew gum or tobacco, smoke, eat or drink anything other than plain water for 30 minutes prior to a quantitative fit test, to avoid erroneous low fit factors.

Prior to the fit test, the person conducting it must provide the respirator user with an outline of the fit test process, including:

- Explanation of the importance of using respiratory protection;
- Description of how to select a properly fitted and comfortable respirator;
- Explanation that the user must wear other personal protective equipment (as during normal operations) during the fit test;
- Explanation of the importance of pre-use inspection;
- Demonstration by the user of the donning process, in accordance with the manufacturer's instructions;
- Explanation of the seal check process and performance of it by the user;
- Explanation of the quantitative fit test process, its purpose and the importance of maintaining a seal between the respirator and the user's skin;
- Description of the currently-equipped cartridges (where applicable);
- Description of the challenge agent and how to identify it;
- Description of the exercises to be performed during the test.

ACCOMMODATION

If a respirator user believes, or is informed that, an accommodation is required, follow the [HR Health and Wellness sector process](#).

RESPIRATOR MAINTENANCE

With N95 respirators being disposable, the following section applies only to tight-fitting facepieces. Respirators must be properly maintained to preserve their effectiveness. A good maintenance program includes:

- Inspection, testing and repair;
- Cleaning;
- Storage;
- Record retention (see "Record retention" section).

Inspection

Users must inspect their respirators before and after each use in accordance with the manufacturer's instructions. The following must be checked:

- Condition of respirator components (including the facepiece, assemblies, cartridges, etc.);
- Tightness of connections;
- End-of-service-life indicators (such as the cartridge indicators, if so equipped) and damage;
- Shelf-life dates;
- Proper functioning of regulators, alarms and other warning systems.

Defective or non-functioning respirators must be identified, tagged as **out of service** and removed from service until repaired or replaced. No one is permitted to use a defective or non-functioning respirator.

Testing and repair

Only qualified persons are allowed to test and repair respirators and cylinders (e.g., for breathing air). Repairs must be conducted by qualified persons using the manufacturer’s replacement parts and repair procedures.

Cleaning

Respirators must be cleaned after every use according to the manufacturer’s instructions. Generally:

- Respiratory protection components should be disassembled;
- Washed in warm water with mild detergent or cleaner recommended by the manufacturer – stiff bristle (not wire) may be used;
- Rinse well the component in clean, warm running water;
- Allow components to air dry;
- Reassemble respiratory and ensure proper functioning.

Storage

Respirators must be stored such that they are protected against any potential hazard, including dust, ozone, sunlight, heat, extreme cold or moisture. Storage must be according to the manufacturer’s instructions, to prevent the deformation of rubber or other parts. Storage in a sealed plastic bag is generally accepted.

Cylinders of breathing air that are not in current use must be stored at reduced pressure to reduce the corrosion rate. For this reason, they must also be stored in the vertical position (valve up, never inverted), with the main valve closed. Cylinders should be stored indoors, in a temperate and dry environment.

CARTRIDGES

Cartridges use a sorbent material to filter the contaminant. The sorbent (e.g. activated carbon) serves as a barrier between the hazard and the respirator wearer. There are varying types and combinations of cartridges for half or full-face respirators, which have been colour coded by the National Institute of Occupational Safety and Health (NIOSH). The most common varieties at uOttawa are listed below. Note that components must be compatible to ensure reasonable protection.

Cartridge Colour	Intended Atmosphere
Purple	Particulate (P100)
Black	Organic vapours
Olive	Multi-contaminant
Green	Ammonia
White	Acid gases
Yellow	Acid and organic vapours

Table 1: Cartridge classification¹

There are three series of particulate filters, each with a range of efficiency levels (e.g., 95%, 99% and 99.97%).

- Series N — for use in environments free of oil mists.

¹ [OHSA Bulletin — General Respiratory Protection Guidance for Employers and Workers](#)

- Series R — acceptable for oil mists, but only for one work shift.
- Series P — acceptable for oil mists for longer than one work shift.

Change-out

Cartridges do not have a defined service life. Some have end-of-life indicators, which alert the wearer to change the cartridge. Many cartridges are not equipped with this feature; therefore, a change-out schedule must be established to ensure they are changed prior to the end of their useful service life. A number of variables affect cartridge service life, including:

- Contaminant chemical properties, physical state and concentration;
- Environment, temperature, humidity and atmospheric pressure;
- Physical or chemical characteristics of the cartridge;
- Surface area and air volume;
- Mechanism used to remove the contaminant (e.g., filtration, electrostatic charge, absorption or adsorption);
- Effectiveness of the cartridge against the contaminants;
- User's breathing rate and volume;
- Pattern of use (e.g., continuous or intermittent);
- Respirator storage method.

Do not rely on contaminant warning properties for purposes of cartridge change-out. Particulate cartridges must be replaced if they become damaged or unhygienic or when breathing becomes difficult; otherwise, based on a change-out schedule or as recommended by the manufacturer.

To avoid using cartridges beyond their service life, check the expiration date on the cartridge packaging and write the installation date on the cartridges when they are first removed from the manufacturer's packaging.

For powered air-purifying respirators (PAPRs), particulate filters must be replaced when the airflow does not meet the manufacturer's requirements.

HEALTH SURVEILLANCE

For more on health issues, see the "Fit testing" section above. As well, Appendix 3 outlines the overarching pre-screening process conducted by Health and Wellness.

All documentation relevant to the respirator screening and any further health information is treated as confidential and maintained by the Health and Wellness office in accordance with the law.

TRAINING

Training of respirator users and their supervisors must cover at least the following:

- Roles, responsibilities and duties set out this document;
- Requirements for participation in the health surveillance program, including respiratory screening;
- Fit testing procedures;
- Proper use and limitations of respirators;

- Care and maintenance of respirators.

For training requirements of other workplace parties, see Table 3 — Summary of Training Matrix in *CSA Z94.4 – Selection, Use and Care of Respirators*. A [general orientation workshop](#) is available online. All personnel involved in this respiratory protection program should take regular refresher training.

PROGRAM EVALUATION

Representatives from the Office of Risk Management, the Health and Wellness sector and the Clinical Placement Risk Management office should review this respiratory protection program on a regular basis. The evaluation must be consistent with section 13 of *CSA Z94.4 – Selection, Use and Care of Respirators*.

RECORD RETENTION

The applicable workplace parties must keep appropriate records of activities conducted under this program. Users' records should be maintained for the duration of their employment or for ten years, whichever is longer.

This table indicates the responsibilities for record retention.

Records	Supervisor of Respirator User	Health and Wellness Office	Clinical Placement Risk Management Office	Office of Risk Management
Hazard assessments (including monitoring of the workplace atmosphere, as applicable) to document the initial and ongoing need for respiratory protection	X	X (for workers)	X (for students on placement)	
Selection of the appropriate respirator for the user, including identification of hazards and assessment	X			
Fit test records, including specific make and model of respirator, type of test and agent used, conditions at time of test, notes on restrictions, fitting difficulties, etc.		X	X (for students on placement)	
Training records for the respirator user or supervisor of respirator user specifying	X			

Records	Supervisor of Respirator User	Health and Wellness Office	Clinical Placement Risk Management Office	Office of Risk Management
training content and dates, trainers' qualifications, etc.				
Respirator maintenance records, including repairs, calibration and storage procedures	X			
Health surveillance records indicating any limitation of use		X	X (for students on placement)	
Program evaluation records				X

RESOURCES

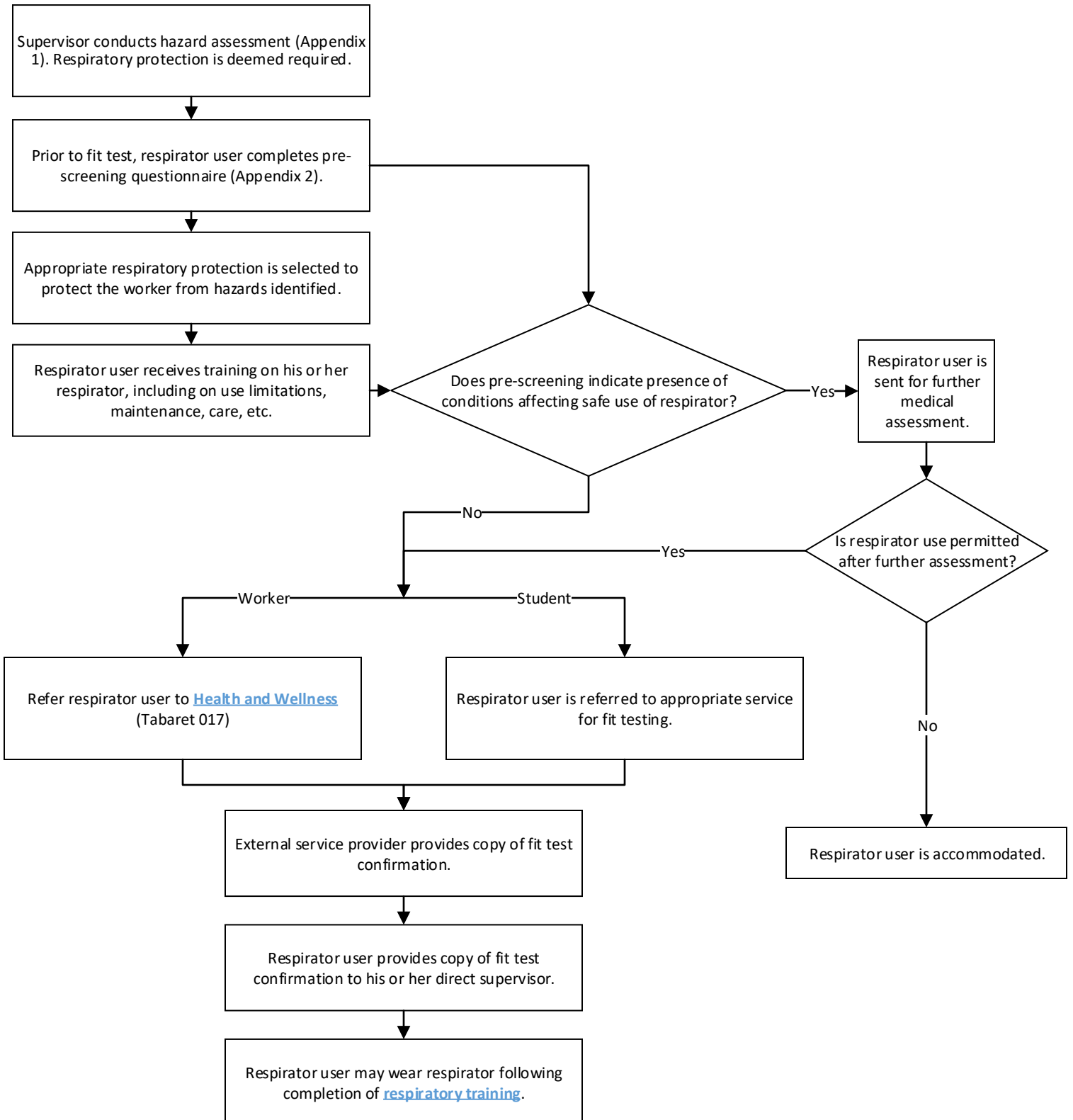
Additional information is available from:

- [Health, safety and risk managers](#)
- [HR Health and Wellness office](#)
- [Office of Risk Management](#)
- [Clinical Placement Risk Management](#)

APPENDIX 1 — HAZARD ASSESSMENT TEMPLATE

Refer to the [hazard assessment template](#).

APPENDIX 2 — RESPIRATOR FIT TEST FLOWCHART



APPENDIX 3 — EXAMPLE OF PRE-SCREENING FORM

Refer to the [pre-screening template](#).