

Respiratory Protection Program



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Important Note

- Personal protective equipment – including respirators – is (usually) the last line of defense for worker protection.
- Other control measures, such as those that eliminate or reduce the hazard, must be explored prior to issuing personal protective equipment

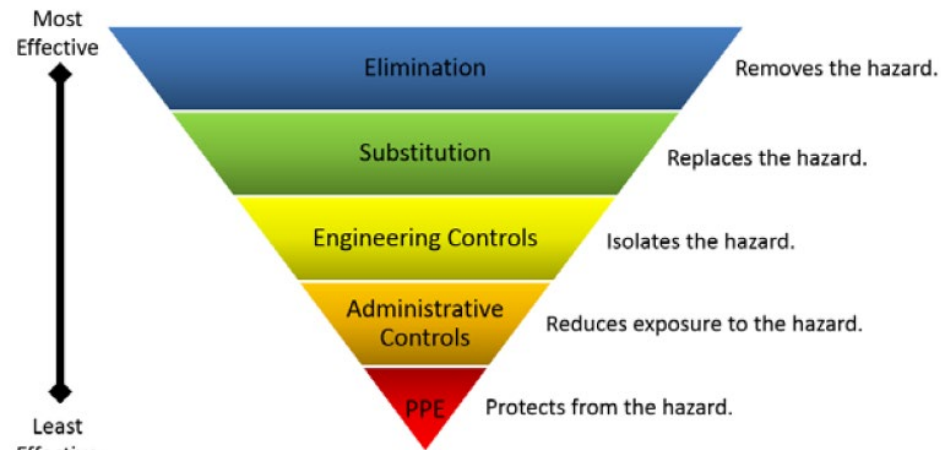


Figure 1: Hierarchy of hazard control

Occupational Health and Safety Act

- Regulation 833 – Control of Exposure to Biological or Chemical Agents
- Regulation 278 – Designated Substance – Asbestos on Construction Projects and in Building Repair Operations
- CSA Standard Z94.4 – Selection, Use and Care of Respirators

What is a Respirator?

- Air purifying — a respirator with an air-purifying filter that removes specific air contaminants by passing ambient air through the air-purifying element.
- Atmosphere supplying — a respirator that supplies breathing air from a source independent of the ambient atmosphere.
- Tight-fitting — a respirator designed to form a complete seal with the face or neck.

Hazards

- Chemical (gases, vapours)
- Particulate (dust, fumes)
- Oxygen deficiency ($> 19.5\%$)
- Biological (aerosolized materials)
- Prescribed respiratory requirements (silica, asbestos, etc.)

Components of uOttawa Respiratory Protection Program

- Roles and responsibilities of workplace parties
- Hazard assessment
- Selection of appropriate respirators
- Training of respirator users
- Health surveillance protocols
- Respirator fit testing
- Appropriate maintenance
- Program evaluation
- Record retention

Roles and Responsibilities

- Procedure 14-1 outlines general requirements for workplace parties. Specific to respiratory protection:
- **Workers:**
 - Understand limitations of equipment;
 - Undergo fit testing regularly, as required;
 - Inspect the respirator; report any damage to the supervisor and remove the respirator from service;
 - Be clean shaven or facial hair permitting a seal;
 - Perform seal checks after donning the respirator;
 - Wear respiratory protection at all required times

Roles and Responsibilities

- **Workers:**

- Clean, maintain and store respirators
- Report any change in physical or psychological condition that could limit ability to wear a respirator to the Health and Wellness (for workers) or Clinical Placement Risk Management office (for placement students) or health, safety and risk manager (for students)

Roles and Responsibilities

- **Supervisors:**

- Identify situations where respiratory protection is required;
- Ensure that other hazard control options have been duly considered prior to considering respirators;
- 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;

Roles and Responsibilities

- **Supervisors:**

- 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 and revise hazard assessment regularly and no less than annually

Roles and Responsibilities

- **Health, Safety and Risk Managers (HSRMs):**
 - Assist supervisors in identifying respiratory hazards;
 - Assist supervisors in conducting hazard assessments;
 - Assist supervisors in selecting appropriate respiratory protection;
 - Provide supervisors with assistance implementing the respiratory protection program;
 - Conduct periodic audits of the respiratory protection program within their faculty or service

Roles and Responsibilities

- **Office of Risk Management (ORM)**
 - 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

Roles and Responsibilities

- **Clinical Placement Risk Management (CPRM)**
 - Be knowledgeable regarding the health effects of respiratory hazards;
 - Be knowledgeable of physiological and psychological stress associated with the use of respirators;
 - Assess prospective respirator users to verify that they can use the respirator safely;
 - Determine if users are medically fit to wear a respirator;
 - Reassess users every two years, or more frequently, as necessary;
 - Maintain records of respirator users' fit tests

Roles and Responsibilities

- **Health and Wellness**

- Be knowledgeable regarding the health effects of respiratory hazards;
- Be knowledgeable of physiological and psychological stress associated with the use of respirators;
- Assess prospective respirator users to verify that they can use the respirator safely;
- Determine if users are medically fit to wear a respirator and arrange for fit testing (workers);
- Reassess users every two years, or more frequently, as necessary;
- Maintain records of respirator users' fit tests


Hazard Assessment

- Critical component of respirator program intended to identify and assess hazards for which respiratory protection has been selected. Assessment includes:
 - Identification of contaminants in the workplace.
 - Identification of physical states of airborne contaminants.
 - Measurement (or estimation) of contaminants.
 - Determination if atmosphere is (or may become) oxygen-deficient.
 - Identification of established occupational exposure limits (OELs) for each airborne contaminant identified.

Hazard Assessment

- Assessment includes:
 - Determination if an IDHL (immediately dangerous to life) atmosphere is present.
 - Determination if there is a specific regulation or substance-specific standard for the contaminant.
 - Determination (for particulate hazards) if there is oil present in the workplace.
 - Determination if the contaminant can be absorbed through, or is irritating to, the skin or eyes.
- Assessment must be documented.

Hazard Assessment

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1 Rue Nicholas Street (840)

Respiratory Protection Hazard Assessment for Chemical Hazards

1. Assessment date:
Click or tap here to enter a date.

2. Name of supervisor conducting assessment:
Click or tap here to enter text.

3. Is the worker currently using a respirator?
 Yes No
If so, what kind of respirator (make/model) and cartridges (if applicable) are being used?
Click or tap here to enter text.

4. Have you explored a hierarchy of hazard controls?
 Yes No
If not, stop this respiratory protection hazard assessment and verify if the hazard can be reasonably controlled at its source.

5. List any known hazardous products and associated details.

Product	CAS #	SDS Reviewed	Quantity and Concentration	OEL	IDLH	Specific Regulation Applicable?	Absorbed/Causes Irritation to Skin/Eyes
		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No

6. Indicate the physical state of the contaminant(s).
 Gas Vapour Particulate


7. Describe in detail the task requiring a respirator.
Click or tap here to enter text.

How frequently is the task conducted?
 Daily Weekly Monthly Annually

Duration of use
 < 1 hour 2-4 hours 5-7 hours 8 hours

Level of exertion

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Light Moderate Heavy Strenuous

8. Describe the working conditions.
Click or tap here to enter text.

Temperature during respirator use
 < 0°C 0-25°C > 25°C

Expected relative humidity during respirator use
 < 25% 25-50% 50-75% > 75%

9. Indicate the location and source of the contaminants.
Click or tap here to enter text.

10. Have you completed atmospheric monitoring?
 Yes No
If so, note the results below or append them to this hazard assessment.
Click or tap here to enter text.
If not, what are the estimated airborne concentrations?
Click or tap here to enter text.

11. What is the oxygen concentration of the work area?
 < 19.5% Ambient > 21.5%


12. Select one or more additional types of personal protective equipment required during respirator use (if applicable).
 Hardhat Glasses Goggles Ear protection Face shield

13. Is airborne oil present?
 Yes No Unknown (assume present)

14. Respirator selection (select one)
 Air purifying respirator
 Tight-fitting
 Powered air purifying respirator
 Supplied air pressure demand
 SCBA
 Other Click or tap here to enter text.
Respirator make: Click or tap here to enter text.
Respirator model: Click or tap here to enter text.

15. Cartridges required (select as many as required)
 Particulate — P100 (purple)
 Organic vapours (black)

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Multi-contaminant (olive)
 Ammonia (green)
 Acid gases (white)
 Acids and organic vapours (yellow)
 Other Click or tap here to enter text.

16. Have you established a cartridge change schedule taking all of the above into consideration?
 Yes No
Describe the cartridge change schedule: Click or tap here to enter text.

17. Has the worker been referred for fit testing?
 Yes No

18. Has the worker received information, training and care instructions for the respirator?
 Yes No

If you have any questions regarding this respiratory protection hazard assessment for chemical hazards, please contact the:

- [Health, safety and risk manager](#)
- [Office of Risk Management](#)

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Respirator Selection

- Must take into consideration:
 - Current hazard controls in place;
 - Physical states of contaminant;
 - Workplace environment;
 - Nature of work;
 - Amount of time on specific tasks;
 - Regulatory requirements (standards, guidelines);
 - Limitations of respirator

Respirator Selection

- Most common types of respiratory protection at uOttawa:
 - Air-purifying respirators (disposable or reusable), powered or non-powered and mechanical or chemical (e.g. N95s, half/full face pieces).
- Very few atmosphere supplying respirators — supply users with breathable air (e.g. fire fighters, divers, etc.).



N95

- Not intended to protect the wearer against:
 - Organic vapours
 - Gases
- Does not supply oxygen
- Easily damaged / contaminated



[How to wear a 3M N95 9210 Respirator](#)

Half / Full Face Respirator



Fit Testing – Seal Check

- A user must check the seal of the respirator immediately after donning it and periodically during use. **A seal check is not a fit test.**
 - **To conduct a negative pressure seal check:**
 - 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 collapsed and no leakage, proper fit.
 - **To conduct a positive pressure seal check:**
 - 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 leakage, proper fit.

Cartridges

- Varying types and combinations of cartridges for half or full-face respirators, which have been colour coded by the NIOSH. Most common varieties at uOttawa:

Purple	Particulate
Black	Organic vapours
Olive	Multi-contaminant
Green	Ammonia
White	Acid gases
Yellow	Acid and organic vapours

- Respirator components must be compatible.

Cartridges

- Series of particulate filters, each with a range of efficiency against particles 0.3 μm and larger in size (e.g., 95%, 99% and 99.97%).
 - Series N — for use in environments free of oil mists
 - Series R — acceptable for oil mists, but only for one work shift
 - Series P — acceptable for oil mists for longer than one work shift

Cartridges

- Affects on cartridge life include environment, temperature, humidity, atmospheric pressure, mechanism used to remove the contaminant (e.g., filtration, electrostatic charge, absorption or adsorption), user's breathing rate and volume, pattern of use (e.g., continuous or intermittent), respirator storage method, etc.
- Cartridges not having end-of-life service indicator require a change-out schedule so that they are changed prior to their end of service life. **Contaminant warning properties may not be relied upon for purposes of cartridge change-out.**

Limitations

- Air purifying respirators may not be used in:
 - Unknown environments;
 - Oxygen deficient environments (less than 19.5%);
 - IDLH environments;
- Air purifying respirators require regular filter changes.
- Supplied air respirators are limited in the volume of available breathing air. Actual service time is generally less than the rated service time. Also limited in their operating environment (dew point – condensation).

Respirator Training

- All parties as part of the respiratory protection program are required to participate in training applicable to their roles.
- CSA Z94.4 outlines the required training in Table 2.
 - Source: Table 2, **CAN/CSA-Z94.4-18, Selection, use, and care of respirators**. © 2018 Canadian Standards Association.

Respirator Training

Table 2
Summary of training matrix
 (See Clauses 8.1.1 and 8.1.4 and Figure 1.)

Position	Roles and responsibilities	Respirator selection process	Respirator user screening	Fit testing	Instruction	Care and practical use	Limitations	Repair and maintenance
Employer	Clause 4.2							
Program administrator	Clause 5.1	Clauses 6, 7, Annexes G, K, L	Clause 12 Annex E	Clause 9, Annexes A, B, C, F, J, M, R	Clauses 1, 8	Clause 10	Annex G	Clause 11
Respirator user	Clause 5.2		Clause 12 Annex E	Clause 9, Annexes A, B, C, F, M	Clauses 1, 8	Clause 10	Annex G	Clause 11
Supervisor of respirator user	Clause 5.3		Clause 12 Annex E	Clause 9, Annexes A, B, C, F, M, R	Clauses 1, 8	Clause 10	Annex G	Clause 11
Person selecting respirator	Clause 5.4	Clauses 6, 7, Annexes G, K, L			Clauses 1, 8		Annex G	
Fit tester	Clause 5.5			Clause 9, Annexes A, B, C, F, J, M, R	Clauses 1, 8			Clause 11
Issuer	Clause 5.6							
Respirator maintenance personnel	Clause 5.7				Clauses 1, 8			Clause 11
Health care professional	Clause 5.8		Clause 12 Annex E		Clauses 1, 8			

Source: Table 2, CAN/CSA-Z94.4-18, *Selection, use, and care of respirators*. © 2018 Canadian Standards Association.


Health Surveillance

- Workers are required to participate in the medical surveillance program coordinated through the Health and Wellness office.
- The program is confidential to the extent required by law and is intended to ensure that a person is capable to safely use a respirator. Respirator use can place physical and psychological burdens on users, dependent on:
 - Health of the user;
 - Type of respirator worn;
 - Job and environment in which the respirator is worn.

Health Surveillance

- Pre-screening is done prior to fit testing and is intended to screen for potential health conditions that may impact the user's ability to safely work with a respirator.
 - Examples include (but not limited to) breathing difficulties, cardiac conditions, physiological features.
- Situations flagged during pre-screening indicates further, medical assessment is required.
 - uOttawa may not permit a medically unfit worker to perform work requiring a respirator.
- Accommodations may be required.

Health Surveillance



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Confidential when completed. Completed questionnaire will be stored in the employee's health file at Health and Wellness.

Respiratory Protection Example Screening Form

PART 1 – WORK UNIT INFORMATION
 Faculty:
 Department:
 Supervisor:
 How long have you been working in this department?

PART 2 – RESPIRATOR USER INFORMATION
 Name:
 Title:
 Employee number:
 Email:

PART 3 – CONDITIONS OF RESPIRATOR USE
3.3 – Describe the task requiring the use of a respirator.

a. How frequently do you conduct the task?
 i. Daily Weekly Monthly Annually

b. Duration of each use
 i. < 1 hour 2–4 hours 5–7 hours 8 hours

c. Level of exertion
 i. Light Moderate Heavy Strenuous

d. Temperature during respirator use
 i. < 0°C 0–25°C > 25°C

e. Atmospheric pressure during respirator use
 i. Reduced Ambient Increased


3.4 – Describe your work conditions. Are there special considerations affecting respirator use (e.g., confined spaces, oxygen deficiency)?

3.4 – Select one or more additional types of personal protective equipment you require during respirator use (if applicable).
 Hard hat Glasses Goggles Ear protection Face shield

3.5 – What is the estimated total weight of tools and equipment you carry?
 Maximum:
 Average:

3.6 – When were you last fit tested for a respirator?

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 Example Respiratory Pre-Screening Questionnaire
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Confidential when completed. Completed questionnaire will be stored in the employee's health file at Health and Wellness.

PART 4 – TYPES OF RESPIRATORS USED
4.1 – Select all types of respiratory protection worn.

Air purifying respirator Tight-fitting Powered air purifying respirator
 Supplied air pressure demand SCBA Other

a. Respirator make:
 b. Respirator model:

PART 5 – RESPIRATOR USER PERSONAL HEALTH CONDITIONS
 Select Yes or No. Do not provide details. We do not require medical information.

5.1 Some conditions can seriously affect your ability to safely use a respirator. Do you use or experience any of the following or any other condition that could affect respirator use?
 Yes No

Shortness of breath	Breathing difficulties	Chronic bronchitis	Emphysema
Lung disease	Chest pain on exertion	Heart problems	Allergies
Hypertension	Cardiovascular disease	Thyroid problems	Diabetes
Neuromuscular disease	Fainting spells	Dizziness or nausea	Seizures
Temperature susceptibility	Claustrophobia	Hearing impairment	Pacemaker
Panic attacks	Colour blindness	Asthma	Fear of heights
Vision impairment	Reduced sense of smell	Reduced sense of taste	
Back or neck problems	Facial or skin condition	Dentures	

5.2 – Have you ever had difficulty while using a respirator?
 Yes No

5.3 – Do you have concerns about your ability to use a respirator safely?
 Yes No

5.4 – Are you currently receiving workplace accommodations for a medical condition?
 Yes No

If you answered "Yes" to questions 5.1, 5.2, 5.3 or 5.4, further assessment by a health care professional is required prior to respirator use.

If you have any questions regarding this sample questionnaire, [email the Health and Wellness office](#).

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 Example Respiratory Pre-Screening Questionnaire
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Fit Testing

- Is a process to ensure a proper fit for the respirator selected to protect the wearer.
- Is conducted in accordance with the qualitative or quantitative processes defined in CSA Z94.4.
- Is only acceptable for the model and size of the respirator for which you were fit tested.

Fit Testing

- Qualitative or quantitative process that verifies the user's ability to obtain an effective seal and acceptably comfortable fit with the selected respirator.
 - Also confirms user's 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 – NO EXCEPTIONS.**

Fit Testing

- Required following the respirator pre-screening (and further medical assessment, if necessary) and:
 - Prior to first wearing a respirator;
 - Changes to the user's physical condition (e.g., major change in weight, dental changes, facial surgery, etc.);
 - Additional PPE is introduced that could affect the fit;
 - Change in facepiece (e.g., brand, model or size);
 - User reports discomfort / difficulty completing work;
 - Every two years.

Fit Testing Procedure

- Supervisor conducts hazard assessment.
- Referral to:
 - Health and Wellness (for workers)
 - Clinical Placement Risk Management (for placement students)
 - Health, safety and risk manager (students)
- Pre-screened for pre-existing health conditions that may affect use of a respirator.
 - If no concerns, person is referred for fit test with external provider.
- Confirmation of acceptable fit provided to worker and referrer. Maintain records.

Fit Testing Procedure

- Worker requiring fit test must:
 - Present themselves in work condition, including wearing of applicable PPE.
 - Be clean shaven or have facial hair conforming to Annex P of CSA Z94.4.
 - Not chew gum or tobacco, smoke, eat or drink anything other than plain water for 30 minutes prior to a the fit testing.

Factors Affecting Proper Fit

Acceptable

Unacceptable



Factors Affecting Proper Fit



Maintenance

- Inspections – prior to/following each use. Looking for:
 - Overall condition (damages, connections, tightness);
 - End-of-service life indicators;
 - Any defects means respirator must be removed from service immediately. No further use and tagged out of service.
- Testing and Repair – only qualified persons should test/repair components.

Maintenance

- Cleaning – after each use according to manufacturer instructions. Generally:
 - Disassemble components;
 - Wash in warm (43 °C max) water with mild detergent or cleaner recommended by manufacturer; stiff bristle (not wire) may be used;
 - Rinse well the components in clean, warm running water;
 - Allow components to air dry;
 - Reassemble respirator and ensure proper functioning

Maintenance

- Store respirator in accordance with manufacturer recommendations. Generally:
 - In a sealed plastic (Ziploc) bag
 - Out of direct sunlight, heat, cold, moisture, ozone, contaminants, etc.

Program Evaluation

- Representatives from:
 - Office of Risk Management
 - Health and Wellness
 - Clinical Placement Risk Managementwill review the 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*.
- Program most recently modified in February 2021.

Record Retention

Records	Supervisor	Health and Wellness	Clinical Placement	Office of Risk Management
Hazard assessments	X	X (workers)	X (students)	
Respirator selected	X			
Fit test records		X	X	
Training records	X			
Maintenance records	X			
Health surveillance		X	X	
Program evaluation				X

Something Wrong?

- Do not remove respirator in the work zone.
 - Leave work area immediately.
 - Report issue to your supervisor.
 - Supervisor investigates cause of problem, with assistance from worker.
 - Corrective action implemented prior to re-entering work zone.
- Repeat respirator donning process – including seal check – even if there was only a temporary interruption.

uOttawa Services

- **For all employee health-related concerns, fit testing or for medical surveillance:**
 - Health and Wellness, Human Resources (Workers)
 - Ext. 1473 | hrhealth@uOttawa.ca
 - Clinical Placement Risk Management (Students)
 - Ext. 3391 | cprm@uottawa.ca
- **For assistance with respiratory protection program requirements:**
 - Health, Safety and Risk Manager (HSRM)
 - Office of Risk Management
 - Ext. 5892 | safety@uottawa.ca

Quiz

- Successful completion of this workshop requires that log in and complete the knowledge assessment. Only successful [completion of the knowledge assessment](#) will log your mark in the LRS system.