Respiratory Protection Program

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1.0 Purpose

The purpose of the Respiratory Protection Program (RPP) is to reduce or eliminate potential harm to employees who may be exposed to respiratory health hazards.

This document is intended to:

- Serve as the Code of Practice governing the selection, maintenance and use of respiratory protective equipment as required by Alberta's Occupational Health and Safety Code;
- Outline the University's respiratory protective practices;
- Serve as a guideline for employees and supervisors to meet the UofC's respiratory protection requirements.

2.0 Scope

The Respiratory Protection Program (RPP) outlines the practices needed to control potential exposure to airborne contaminants when engineering or administrative controls are not reasonably practicable or adequate. The respiratory protection program would also be implemented during maintenance, repair, or emergency activities where airborne contaminants are present and other controls are not reasonable. The University acknowledges the hierarchy of controls as listed below and recognizes that personal protective equipment, including respirators, are normally the last resort in minimizing hazards associated with airborne contaminants.

Hierarchy of controls:

1) Hazard elimination or substitution
2) Engineering controls
3) Administrative controls
4) Personal protective equipment controls

The University will meet or exceed the legislative requirements of the Alberta Occupational Health and Safety (OH&S) Act, Regulation and Code. This RPP is written in compliance with the Alberta Occupational Health and Safety (OH&S) Act, Regulation and Code Part 18, and follows the guidelines of the Canadian Standards Association (CSA) Standard Z94.4-11 for the Selection, Use, and Care of Respirators.

3.0 Definitions

Administrative Controls	Controls that alter the way the work is done, including timing of work, policies and other rules, and work practices such as standards and operating procedures (including training, housekeeping, equipment maintenance, and personal hygiene practices).
EHS	Environmental Health and Safety.
Employee	An individual who is engaged to work for the University under a contract of service, that is, there is an employer-employee relationship between the individual and the University. For clarity, this term includes support staff, management and professional staff, the senior administration group, researchers, graduate students who are remunerated by the University, and faculty members.

Engineering Controls	Is the preferred method of hazard control if elimination is not possible; physical controls implemented at the design, installation, or engineering stages (e.g. guards, auto shutoff, etc.).
Formal Hazard Assessment	The identification of all jobs and tasks performed by employees, assessment of the hazards associated with each task and the prioritization of the hazards based on the level of risk they pose. At the University of Calgary, formal hazard assessments are completed using the Hazard Assessment and Control Form (HACF).
IDLH	An atmosphere that poses an immediate threat to life or that will cause irreversible adverse health effects or impair an individual's ability to escape.
Manager	An Employee who has management responsibility and direct reports.
NIOSH	National Institute for Occupational Safety and Health.
NPAPR	Non-Powered Air-Purifying Respirator: a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.
OH&S	Alberta's Occupational Health and Safety Act, Regulation and Code
Personal Protective Equipment (PPE)	Equipment used or clothing worn by a person for protection from health or safety hazards associated with conditions at a work site (e.g. gloves, safety glasses, fall protection, respirator etc.). PPE is used when engineering or administrative methods cannot fully control the hazards.
PAPR	Powered Air-Purifying Respirator: A respirator where the pressure in the facepiece or hood remains positive with respect to the ambient pressure during both inhalation and exhalation.
Qualitative Fit Test	A pass/fail test method that relies on the subject's sensory response to detect a challenge agent in order to assess the adequacy of respirator fit.
Quantitative Fit Test	A test method that uses an instrument to assess the amount of leakage into the respirator in order to assess the adequacy of respirator fit.
SAR	Supplied-Air Respirator: a respirator and air supply hose with a hood/helmet, a tight-fitting facepiece, or a loose-fitting facepiece/visor that is supplied with compressed breathing air from a compressed breathing air system.
SCBA	Self-contained breathing apparatus: a respirator that has a portable supply of breathing gas and is independent of the ambient atmosphere.
Supervisor	An Employee who supervises other Employees; it does not include a Manager. Supervisors have direct reports.
Worker	Person engaged in an occupation. Alberta OHS Act (2009).

4.0 Responsibilities

4.1 Supervisors and Managers

- Consider the use of hazard elimination/substitution, engineering controls, and administrative controls prior to or in conjunction with the use of respiratory protective equipment (RPE);
- Ensure that tasks that require respiratory protection are identified on a Hazard Assessment and Control Form (HACF);
- Ensure that Standard Operating Procedures (SOPs) are developed for tasks requiring respiratory protection and that the SOP(s) are referenced on the HACF;
- Communicate to workers any activities where respiratory protection has been identified as a control on their HACF and as part of a SOP;
- Ensure that workers review the HACF and are adequately trained in the SOP; including emergency response and the use of appropriate personal protective equipment;
- Ensure that workers review the Safety Data Sheet (SDS) associated with the hazardous materials in their work environment;
- Assist workers with completing “respirator selection form (part 1)” (See Appendix A-1.0) as needed and contact Staff Wellness for fit testing;
- Verify workers have completed all fit testing requirements and have demonstrated competency prior to the use of RPE;
- Maintain training and fit test records in personnel files and verify that workers are fit tested every two years, or earlier if conditions arise that may alter the shape of a worker’s face, or potential respiratory hazards change;
- Provide RPE as determined by the fit test and ensure that all required RPE is maintained and inspected as per manufacturer specifications and training;
- Maintain records of cleaning, inspection and maintenance of respiratory equipment;
- Ensure any RPE reported to be defective is adequately repaired or replaced;
- Ensure that a worker is retrained every two years as per fit test instructions (prior to fit testing). Retraining is also indicated if there are concerns that a worker is not competent with the use of their RPE (e.g. Not performing user seal checks or if facial hair or other potential seal interferences are present);
- Ensure EHS and Staff Wellness are notified if changes to a process, equipment, controls, chemicals used, or operating procedures have occurred to enable verification of appropriate RPE.

4.2 Workers

- Participate in required training (online training course, fit testing etc.);
- Follow the Respiratory Protection Program and SOP(s);
- Review the HACF and SDS;
- Consider the use of hazard elimination/substitution, engineering controls, and administrative controls prior to or in conjunction with the use of respiratory protective equipment (RPE);
- Follow all health and safety standards, rules and regulations, and report any conditions that may impair the safe use of a respirator to the supervisor immediately;
- Report to Staff Wellness any changes to the worker’s health that would impact their ability to wear a respirator;
- Wear, maintain, inspect, and store RPE as per manufacturer specifications and received training; including performing user seal checks and ensuring no potential seal interferences are present;
- Wear only RPE as identified during the fit test.

- Remove any defective RPE from service until they can be adequately repaired or replaced.

4.3 Staff Wellness

- Review current OH&S information to ensure the University is compliant with regulatory requirements, standards and best practices;
- Respirator selection will be determined in consultation with EHS (if necessary), the worker and supervisor. Selection will be based on a review of the activity including:
    - Frequency of exposure
    - Duration of exposure
    - Concentration and quantity of chemical being used
    - Review of occupational exposure limits
    - If exposure to the contaminant is immediately dangerous to life and health (IDLH)
    - Review of other possible controls
- Review submitted health information and determine fitness to wear a respirator in consultation with the third party physician if necessary;
- Inform necessary stakeholders (WCB, Alberta Health, EHS) if an employee has suffered injury or illness due to exposure;
- Fit test the worker for the chosen respirator;
- Ensure that at the time of the worker's fit test, the worker has completed the required training and demonstrated competency for using a respirator including inspection, cleaning, storing, donning/doffing, performing user seal checks, and preventing seal interferences;
- Ensure cleaning and disinfection of respirators and equipment used for fit testing;
- Maintain documentation for repair, maintenance, and calibration of quantitative fit test equipment;
- Maintain documentation related to respiratory protection (respirator user screening, training, medical surveillance and fit test records) and add employee to a respiratory protection exposure group;
- Contact employees/supervisors for recalls for fit testing and relevant medical surveillance;
- Review and update the RPP and any other associated documents as required with participation from EHS.

4.4 Physician

- When requested, review submitted respirator selection forms part 1 and 2 (Appendix A-1.0) for fit testing, including potential health effects associated with exposure to respiratory hazards;
- Conduct physical exam for any employees:
    - Who may require a respirator in an IDLH situation
    - Requiring use of a SCBA
    - Requiring use of a SAR
- Review documentation and perform a physical exam (if necessary) for employees requiring a respirator who have self-identified a relevant health condition;
- Document if the worker meets medical requirements with reported limitations, or does not meet medical requirements to use RPE;
- Communicate employee's ability to safely wear a respirator to Staff Wellness.

4.5 Environmental Health and Safety

- As needed, review work activities to determine if air monitoring is required and/or to provide direction on the use of controls including engineering, administrative, and personal protective equipment;
- Investigate incidents and near misses where there has or could have been exposure to airborne contaminants to evaluate control effectiveness and advise on corrective measures to minimize exposure;
- Make appropriate recommendations for respirator, filter, and cartridge selection and change out schedule when requested;
- Assist in providing current information needed to achieve compliance with Alberta OH&S legislation and maintaining best practices as per industry standards.

5.0 Respiratory Protection Program Overview

5.1 Hazard Assessment

Employees must be familiar with the hazards and potential health outcomes associated with the products that they work with. Supervisors are responsible for ensuring that their employees are familiar with the potential hazards associated with their employee's work. The hazard assessment and control from must be readily available and must clearly state:

- The task to be performed;
- The hazards associated with the task, specifically identifying the respiratory hazard;
- The controls required to reduce or eliminate the hazardous exposure including:
    - engineering controls (e.g. ventilation, fume hoods)
    - reference to this respiratory protection program
    - relevant SOP(s)
    - details of necessary respiratory protective equipment (i.e. respirator type, cartridge required)
    - online training
    - fit testing

Hazard assessments should be reviewed and updated on a regular basis and when there is a change. Employees and supervisors should bear in mind that hazard assessments require updating if:

- new hazards are introduced;
- work processes or the work environment changes;
- an employee's health status changes;

Information on hazardous materials and processes can be collected from the following resources (are not limited to):

- Manufacture/Supplier information, example:
    - Safety Data Sheets (SDS)
    - Source animal information
- Pathogen Safety Data Sheets (PSDS)
- Supervisor
- Environmental Health and Safety (EHS) Department
- Occupational Health Nurse (OHN), Staff Wellness
- Other Health Care Providers
- Other Health and Safety Professionals

5.2 Air Monitoring

At the University, the decision to conduct air monitoring is based on a review of the work activity including frequency, duration, concentration and quantity of the chemical being used, established occupational exposure limits, and controls in place for the activity. When air monitoring is not required or feasible based on the activity review, the use of respiratory protective equipment is left to the discretion of the supervisors and workers under the guidance of EHS and Staff Wellness.

5.3 Pre-Fit Test Documentation

To initiate the fit testing process, the Respirator Selection Form Part 1: Hazard Assessment (Appendix A-1.0) must be completed by the worker with assistance from the supervisor as necessary. Part 1 and Part 2 of this form will be reviewed by Staff Wellness.

5.4 Training

- Employees are required to complete the online Respiratory Protection course prior to their fit testing session;
- Additional training will be provided to respirator users at the time of fit testing as outlined in Section 5.7 Fit Test;
- If training for specialized respiratory equipment (e.g. SCBA, Supplied Air Respirator, etc.) is required, employee or supervisor must contact Staff Wellness to arrange appropriate training;
- Supervisors are responsible for ensuring that employees receive appropriate training for respirator use.

5.5 Choose Appropriate Respirator

Staff Wellness will assist with the selection of the appropriate respirator based on a review of the information provided by the employee and supervisor. This information will be recorded on the fit test record. The process for selecting an appropriate respirator is outlined in Figure 1 and Tables 1-2 in Appendix A-2.0. The respirator choice will be approved Staff Wellness.

5.6 Medical Review

The Respirator Selection Form Part 2: Health Screening (Appendix A-1.0) will be reviewed by the Occupational Health Nurse (OHN). The OHN determines if further medical review is required by a physician based on the type of respirator being used and the health information reported by the employee.

The OHN will provide a comprehensive medical review (consult physician if necessary) if the respirator user:

- Has identified a health condition that may affect their ability to wear a respirator safely

A physician medical review will be required if the respirator user:

- Will be required to work in an immediate danger to life and health (IDHL) situation
- Requires the use of a self-contained breathing apparatus (SCBA)
- Requires the use of a supplied air respirator

5.7 Fit Test

Once the employee has been deemed medically fit to wear a respirator, a respirator fit test will be conducted by Staff Wellness. Fit testing procedures will include:

- Education on respirator selection, use, limitations, care and maintenance;
- Qualitative testing with hood and bitrix or sweet solution (for N95)
    - if a fit cannot be established using one of these methods, then the employee will be provided quantitative fit testing
- Quantitative testing with Porticount (required for all reusable respirators)
    - If employee does not demonstrate an appropriate fit, tester will try a variety of respirator sizes and brands. If a fit cannot be established using a quantitative fit test, then other options for respiratory protection may be discussed with the department.
- Employee must verify understanding of limitations and demonstrate competency of respirator use, care and maintenance;
- Fit testers shall follow the requirements of the program and CSA fit testing standard (Z94.4-11) and shall not perform a fit test if they observe that the person is not free from interference where the respirator seals to the skin of the face or neck;
- Records of testing are printed and reviewed with the employee;
- Records are signed by tester and employee (employee signature not required on qualitative fit test record) and a copy is provided to the supervisor;
- Records will be stored in Medgate;
- Employee returns for recall:
    - in two years
    - if there is a physical change to the face that would warrant re-testing
    - if a different type of mask is required based on a change in potential respiratory hazards (e.g. a new hazardous contaminant is encountered and requires increased protection factor)
- Responsibility for recalls is shared by the employee, supervisor, and Staff Wellness.

6.0 Use of Respirators

Respirator use is based on the CSA standard Z94.4-11 Selection, use and care of respirators.

6.1 User requirements

Before being assigned any task that requires the use of a respirator, the user shall meet all the health screening, training, and fit testing requirements in this program.

6.2 Tight-fitting respirator seal with skin

Respirators requiring a tight fit in order to perform effectively shall not be worn when an effective seal to the face or neck of the person cannot be achieved and maintained.

To promote the safety of persons using tight-fitting respirators, the seal to the face or neck shall be effectively maintained in accordance with the requirements of the Respirator Interference Concerns section of this program document (Appendix C) throughout the period during which respirator use is required. If during the course of work, a person develops any condition that degrades the respirator seal to the face or neck, the person shall restore the required interference-free condition in a non-hazardous environment.

6.3 Respirator interference concerns

Workers and supervisors shall ensure that potential interferences to the fit and function of the respirator are effectively managed according to the requirements described below.

Individuals who are unwilling or otherwise unable to comply with the interference-free requirement, or who are unable to obtain an acceptable fit, shall be prohibited from using a tight-fitting respirator.

6.3.1 Facial Hair

Individuals shall present themselves for fit testing free from interference of hair with the respirator function, valves or where the respirator seals to the skin of the face or neck.

The rate of hair growth varies, for many this requires being clean-shaven within the previous 24 or preferably 12 h to ensure that hair neither infringes on the sealing surface of the respirator nor interferes with valve or respirator function. See Appendix C for examples of acceptable and unacceptable facial hair growth.

6.3.2 Personal conditions

Individuals shall present themselves for fit testing in the same personal condition they would expect to be in when using the respirator. This includes hair styles (e.g., hair buns) and wearing or not wearing dentures, eyeglasses, or contact lenses.

The use of contact lenses may be approved by the Occupational Health Nurse after consideration of those factors inside and outside the tight-fitting respirator that could affect the eyes of the user.

6.3.3 Personal effects or accessories

Individuals shall present themselves for fit testing in such a way that personal accessories such as head coverings, garments, facial jewelry, or other items shall not come between the skin and the sealing surface of the respirator.

Note: Such accessories can impair respirator effectiveness by interfering with valve function, respirator adjustability, and proper secure positioning. Makeup, creams, or lotions can also interfere with effective respirator function.

6.3.4 PPE integration

When PPE such as eye, face, head, or hearing protectors or protective garments are required to be worn during respirator use, they shall be worn during respirator fit testing to ensure that the respirator seal is not compromised.

6.4 User seal check of face-to-facepiece seal

The user of a respirator shall check the seal of the face-piece immediately after donning the respirator in accordance with online training and fit testing instructions. A user seal check shall not be used as a substitute for a qualitative or quantitative fit test.

6.5 Communications when using a respirator

The respirator face-to-facepiece seal shall not be broken to communicate.

Note: Verbal communication while using a respirator is often necessary to perform specific tasks; however, movement of facial features while talking can adversely affect the seal of the face-piece. The use of various types of mechanical and electronic speech transmission devices can minimize the possibility of face-piece leakage when the user is speaking.

Respirators for use in a hazardous atmosphere that requires intrinsic safety and that are equipped with electronic speech transmission devices having an electrical power supply shall be intrinsically safe.

Note: In extremely cold weather, battery power can be unreliable.

6.6 Change-out procedures, schedules and service time

A qualified person shall establish a change-out schedule for the replacement of air-purifying filters or cartridges of respirators before their useful service life is ended. Warning properties of the contaminant shall not be relied on for cartridge/canister change-out, should workers detect odour, experience resistance when drawing breath, or experience any irritation symptoms of the contaminant before the end of the change-out schedule, Staff Wellness shall be informed and shall re-evaluate this respirator use, i.e., the change-out schedule, the workplace concentrations, or other conditions of use [relative humidity (RH), work rate, etc.].

Note: Respirator cartridge change-out can include end-of-service-life indicators, maximum use time, and breathing resistance as appropriate.

The useful service life of a gas/vapour cartridge or canister or a particulate filter is affected by several factors, including:

a) The contaminant's chemical properties, physical state, and concentration;
b) The environment, temperature, humidity, and atmospheric pressure;
c) The physical/chemical characteristics of the air-purifying element; surface area, volume;
d) The mechanism used to remove the contaminant; filtration, electrostatic charge, and absorption or adsorption;
e) The effectiveness of the air-purifying element against the contaminants;
f) The breathing rate and volume of the respirator user;
g) The pattern of use, whether continuous or intermittent.

Workers shall exit a contaminated work area whenever they detect the odour of the contaminant or experience any irritation symptoms caused by it;

6.7 Supplementary Respirator Use Information

Refer to Appendix B: Use of Respirators for specifics:

B-1.0 Gas/vapour-removing cartridges or canisters
B-2.0 Particulate filters
B-3.0 Self-contained breathing apparatus service time
B-4.0 – Breathing gas
B-5.0 – Special requirements for general industrial use
    B-5.1 – Use of respirators in IDLH atmospheres

7.0 Cleaning, Inspecting, Maintaining and Storing Respirators

Respirator users must follow the guidelines in Appendix D for cleaning, inspection, maintenance and storage of respirators:

Cleaning

D-1.0 – General
D-2.0 – Cleaning and sanitizing

Inspections

D-3.1 – General
D-3.2 – Inspection coverage
D-3.3 – Inspection of SCBA cylinders

Maintenance

D-4.0 – Repair and test

Storage

D-5.0 – Storage
D-5.1 – Storage of cylinders not in current use
D-5.2 – Rotation of cylinders in current use

8.0 Program Evaluation

This program will be reviewed by Staff Wellness in conjunction with Environmental Health and Safety as needed.

Key elements for review will include:

- A review of program elements against regulatory requirements;
- A review of roles and responsibilities;
- A review of documented program procedures;
- A review of current voluntary/mandatory standards and best practices for respiratory protection;
- Review of storage and maintenance procedures for respirators.

9.0 Record Keeping

Supervisors: Supervisors are responsible for maintaining fit testing records for employees. Records must be retained for 10 years following the date of assessment. Proof of training will be maintained in the University's Enterprise Learning system. Maintenance records for equipment must be retained as per manufacturers' recommendation and Alberta's Occupational Health and Safety Code requirements.

Staff Wellness: Staff wellness is responsible for maintaining fit testing records for employees. Records must be retained for 10 years following the date of assessment.

Employee medical information will be stored by Staff Wellness for 70 years following date of assessment. Medical records for students will be retained by the student's health provider and not stored by Staff Wellness.

10.0 Appendices

Appendix A – Respirator Selection

A-1.0 – Respirator Selection Form

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Respirator User Form
Send completed form to confidential fax # 403-282-8603 or email staffwellness@ucalgary.ca for review

Part 1: Respirator Selection Information Form

Section 1.0 to 6.0 to be completed be the worker and/or the supervisor

1.0 WORKER INFORMATION

Last Name:	First Name:	UCID#:	Email:
Phone #:	Work Site Location:	Department:	Job Title:
Supervisor Name:	Supervisor Email:	Supervisor Phone #:	Date:

2.0 HAZARD IDENTIFICATION

Air Contaminant Identification	CAS Registry Number	SDS Reviewed	Quantity and Concentration Used	Can substance be absorbed through or cause irritation to the eyes or skin?
		☐		☐ Yes ☐ No
		☐		☐ Yes ☐ No
		☐		☐ Yes ☐ No
		☐		☐ Yes ☐ No
		☐		☐ Yes ☐ No
		☐		☐ Yes ☐ No
		☐		☐ Yes ☐ No

3.0 HAZARD ASSESSMENT

Immediately Dangerous to Life and Health (IDLH)? ☐ Yes ☐ No
Oxygen Content: ☐ Below 19.5% ☐ Ambient ☐ Above 21.5%
Toxic Contaminant? ☐ Yes ☐ No
Air Contaminant Type(s)? ☐ Gas / Vapour ☐ Particulate* ☐ Both
*If particulate, is there oil present in the workplace? ☐ "N" – No oil present ☐ "R" – Oil possible ☐ "P" – Oil present

4.0 CONDITIONS REQUIRING RESPIRATOR USE

Activities requiring respirator use:
Frequency of use: ☐ Daily ☐ Weekly ☐ Monthly ☐ Yearly ☐ Varies ☐ Rarely
Exertion level: ☐ Light ☐ Moderate ☐ Heavy ☐ Strenuous ☐ All
Duration of use per shift: ☐ < ¼ hr ☐ > ¼ hr ☐ > 2 hrs ☐ Variable
Temperature during use: ☐ < 0° C ☐ 0 - 25° C ☐ > 25° C ☐ All temps
Make/Model of respirator(s) currently used:

5.0 WORK CONDITIONS

Emergency Escape Needed or Potentially Needed: ☐ Yes ☐ No
Location of safe area relative to hazardous area:
Uncontrolled Hostile: ☐ Emergency escape ☐ Fire fighting ☐ Rescue operations ☐ Spill clean up
Environment: ☐ Confined spaces ☐ Other:
Has the work activity been identified on the HACF? ☐ Yes ☐ No ☐ Attached
Has the work activity been identified on the SOP? ☐ Yes ☐ No ☐ Attached
Engineering controls used: ☐ Yes ☐ No Specify:
Administrative controls used: ☐ Yes ☐ No Specify:
PPE used: ☐ Hard hat ☐ Safety glasses ☐ Goggles ☐ Noise muffs ☐ Hood ☐ Other:

FOR INTERNAL USE

6.0 TYPES OF RESPIRATORS REQUIRED (Staff Wellness to Complete - check all that apply):

☐ Non-powered air purifying (NPAPR)* ☐ Powered air purifying (PAPR)* ☐ Supplied-air pressure demand ☐ SCBA
☐ Supplied-air continuous-flow ☐ Other (specify):

7.0 ENVIRONMENT, HEALTH & SAFETY REVIEW (if required)

Hazard Ratio = Airborne Concentration / OEL =
Minimum Protection Factor Needed:
*Type of Filter / Cartridge Recommended:
Additional Requirements Needed? ☐ Yes ☐ No
Explain:

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UNIVERSITY OF CALGARY

Respirator User Form
Send completed form to confidential fax # 403-210-9400 or email staffwellness@ucalgary.ca for review

Part 2: Health Screening Questionnaire

This information is required to assess any medical conditions that you may have which would preclude the wearing of a respirator. Further medical examination by a physician shall be required if this initial assessment determines the need for medical clearance to wear a respirator.

1.0 WORKER INFORMATION

Last Name:	First Name:	UCID#:	Email:
Phone #:	Work Site Location:	Department:	Job Title:
Supervisor Name:	Supervisor Email:	Supervisor Phone #:	

2.0 RESPIRATOR USER HEALTH CONDITION

Check Yes or No box only. Do not specify medical information on this form

a) Some conditions can seriously affect your ability to safely use a respirator. Do you have or do you experience any of the following or another condition which may affect respirator use? ☐ Yes ☐ No

Shortness of breath	Breathing difficulties	Chronic bronchitis
Lung disease	Asthma	Dizziness/nausea
Hypertension	Chest pain or exertion	Hearing impairment
Allergies	Emphysema	Reduced sense of taste
Diabetes	Fainting spells	Reduced sense of smell
Panic attacks	Seizures	Back/neck problems
Vision impairment	Colour blindness	Cardiovascular disease
Dentures	Pacemaker	Unusual facial features/skin conditions
Thyroid problems	Heart problems	Prescription medications to control a condition
Neuromuscular disease	Temperature susceptibility	Other condition affecting respirator use
Claustrophobia/fear of heights		

b) Have you had previous difficulty while using a respirator? ☐ Yes ☐ No

c) Do you have any conditions about your future ability to use a respirator safely? ☐ Yes ☐ No

A 'Yes' answer to (a), (b) or (c) indicates further assessment by a health care professional is required prior to respirator use. Please contact Staff Wellness at 403-220-2918 to arrange an appointment for further health assessment.

If respirator protection is to be used in an IDHL atmosphere, further assessment by a health care professional is required and Staff Wellness should be contacted to make arrangements. Powered air respirator (e.g. PAPR, SCBA) would be used in IDHL atmospheres.

I have answered the questions truthfully, to the best of my ability and knowledge. I agree to report to my department/faculty, Staff Wellness and my physician any change in my physical health that might affect my ability to wear a respirator. I consent to allow Staff Wellness to send information regarding my fitness to wear a respirator to my supervisor. Please note: this consent will remain effective unless revoked by me in writing.

SIGNATURE – RESPIRATOR WEARER

Name (printed):	Signature:	Date:

A-2.0 – Respirator Selection Process

(adapted from OH&S Safety Bulletin: Respiratory Protective Equipment: An Employer's Guide 2013)

Figure 1. Choosing an Appropriate Type of Respiratory Protective Equipment

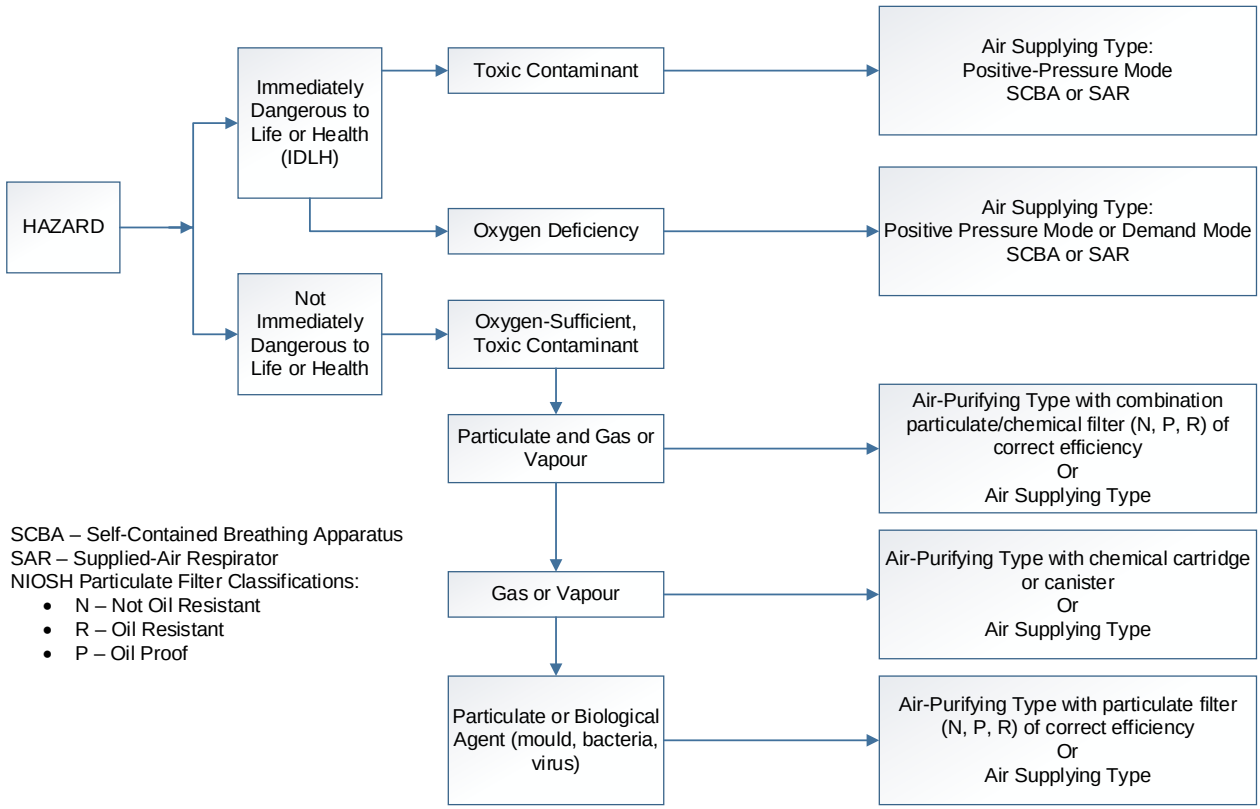

Table 1. Air-Supplying Respirators

Type	Sub-Type	Assigned Protection Factor	Limitations
Airline Types (2) Includes: Airline Respirators, Hoods, Helmets, and Suits	Demand Mode Half-Face piece	50	Hose limits the workers' mobility. Only *positive-pressure* (1) equipped units with an escape air-supply bottle may be used in immediately dangerous to life or health (IDLH) situations. *without simulated workplace protection factor study (SWPF); 1000 APF with a SWPF
	Demand Mode Full-Face piece	1000 (3)	
	Positive Pressure(1) Half-Face piece	50	
	Positive Pressure (1) Full-Face piece	1000	
	Helmet/Hood (4)	25*	
	Loose-Fitting Face piece (4)	25	
Self-Contained Breathing Apparatus (SCBA)	Demand Mode Full-Face piece	100 (3)	Use time limited by worker training and cylinder capacity. Bulk and weight limits use for strenuous work and work in confined spaces. Only *positive pressure* (1) units with at least a 30-minute capacity and a low-capacity warning alarm may be used in IDLH situations.
	Pressure-demand (positive pressure)	10,000	

1. Positive pressure refers to pressure-demand mode or continuous-flow mode respirators.

2. Air used for atmosphere-supplying respirators must be of a quality that complies with Table 1 of CSA Standard Z18O.1-00, Compressed Breathing Air and Systems, and does not contain a substance in a concentration greater than 10% of the applicable Occupational Exposure Limits listed in Alberta's Occupational Health and Safety Code. (This does not apply to substances already listed in Table 1 of the CSA Standard).
3. Assigned protection factors listed are from CSA Standard Z94.9-11 for a respirator that has been fitted using quantitative fit-test methods according to the standard. If qualitative fit testing is done, the assigned protection factor for demand-mode airline respirators and SCBA is 10.
4. Need not be fit tested.

Table 2. Air-Purifying Respirators

Type	Sub-Type	Assigned Protection Factor	Limitations
Non-Powered Air Purifying (NPAPR) Particulate Filter	Half-Face Piece	10	Unacceptable for protection in IDLH conditions or oxygen deficient atmospheres. Choice of filter depends on identity of contaminant and, for particulate respirators, the presence of oil. (1) Service life depends on factors such as the type and amount of filtering medium, concentration of contaminant, temperature and humidity.
Chemical Cartridge or Canister Combination Particulate/Chemical	Full-Face Piece	50 (2)	
Powered Air-Purifying Respirator (PAPR)	Half-Face Piece	50	*without simulated workplace protection factor study (SWPF); 1000 APF with a SWPF
	Full-Face Piece	1000	
	Helmet/Hood (3)	25*	
	Loose-Fitting Face Piece (3)	25	

1. NIOSH has classified air-purifying particulate filters as "N" (Not oil resistant), "R" (oil Resistant), or "P" (oil Proof). You can obtain these filters with filtering efficiencies of 95%, 99% or 99.97%.
2. Assigned protection factors listed are from CSA Standard Z94.9-11 for a respirator that has been fitted using quantitative fit-test methods according to the standard. If qualitative fit testing is done, 10 is the assigned protection factor for a full face-piece air-purifying respirator.
3. Need not be fit tested.

Appendix B – Supplementary Respirator Use Information

(adapted from the CSA standard Z94.4-11 Selection, use and case of respirators)

B-1.0 Gas/vapour-removing cartridges or canisters

B-1.1

Gas/vapour-removing cartridges or canisters equipped with an end-of-service-life indicator shall be replaced when the indicator dictates.

B-1.2

Gas/vapour-removing cartridges or canisters not equipped with an end-of-service-life indicator shall be replaced based on an established procedure or schedule that ensures that the cartridge is changed before the service life has ended.

B-1.3

The selection of air-purifying respirators shall include a change-out schedule calculated by a qualified person using the manufacturer's product information or estimated based on knowledge of the effectiveness of the cartridge or canister to remove the contaminant. The respirator manufacturer should be consulted for guidance on the effectiveness of any specific respirator or air-purifying element against the contaminant for which protection is needed.

B-2.0 Particulate filters

B-2.1

Particulate filters shall be replaced:

a) If they become damaged or unhygienic; or
b) Based on the manufacturer's recommended change-out schedule.

B-2.2

Particulate filters (N, P, and R filters) shall be replaced when breathing becomes difficult or as recommended by the manufacturer. In the case of powered air-purifying respirators (PAPRs), particulate filters shall be replaced when the air flow does not meet the manufacturer's requirements.

B-2.3

If used in atmospheres where oil is present, R filters shall be replaced after 8 h of use or after the respirator has been exposed to 200 mg of the contaminant. R filters shall be used for more than 8 h only if a change-out schedule is calculated by a qualified person based on representative airborne particulate concentrations and estimated breathing rate (tidal volume).

B-2.4

The change-out schedule for combination gas/vapour and particulate cartridges or canisters with non-separable air-purifying elements shall be based on the lesser service time for either the gas/vapour or the particulate constituent.

B-3.0 Self-contained breathing apparatus service time

B-3.1

Pressure-demand SCBA or a multi-functional SCBA/airline respirator with auxiliary self-contained air supply, with a minimum rated service time of 15 min, shall be used for entry into IDLH atmospheres. Where a multi-functional SCBA/airline respirator is used for entry using the auxiliary air supply, no more than 20% of the auxiliary air shall be used before connection is made to an airline.

B-3.2 Escape from an IDLH atmosphere

For escape from IDLH atmospheres, the SCBA or escape SCBA shall have a rated service time in excess of the anticipated time needed to escape.

B-4.0 Breathing Gas Requirements

Only compressed breathing air meeting the requirements of CSA Z180.1 shall be used in open-circuit SCBAs, airline respirators, and supplied-air suits. Compressed oxygen shall never be used in respirators manufactured for use with compressed breathing air.

Note: Compressed breathing air can contain low concentrations of oil. Oxygen forms explosive mixtures with organic materials such as oil and grease. Gaseous oxygen is a powerful oxidizer and can constitute a considerable fire hazard.

Compressed breathing oxygen shall meet the purity requirements of CGA G-4.3.

B-5.0 Special requirements for general industrial use

Workers that require respirator use in non-typical environments should refer to CSA Standard Z94.4-11 Selection, use, and care of respirators as the details for use are not outlined in this document.

E.g. working in environments with extremely high or low temperature and pressure

B-5.1 Use of respirators in IDLH atmospheres

- Respirator users shall not remove their face-piece at any time while working in an IDLH atmosphere.
- For additional requirements where respirators are used during firefighting, hazmat response, mine rescue, or confined space entry, reference shall be made to legislation, regulations, standards, and guidelines. For example: see NFPA 1404, NFPA 1500, and CSA Z1006.
- Respirators designated for escape must only be used for that purpose (i.e. not for general purpose use).

Appendix C – Acceptable & Unacceptable Facial hair

(CSA standard Z94.4-11)

The following are examples of acceptable and unacceptable facial hair growth (These examples are limited, not comprehensive, and are provided only as guidance for fit testers, supervisors, and users. Variations not illustrated below do not necessarily meet the criteria for acceptable facial hair):

Acceptable

A. Clean-shaven, ideal for a good seal	
B. Amount of facial hair that will typically allow a good seal	
C. Moustache that does not interfere with the sealing surface, valves, or respirator function	
D. Soul patch that does not interfere with the sealing surface, valves, or respirator function	

Unacceptable

E. Soul patch that will interfere with the respirator seal in the chin area on elastomeric facepieces Facial hair and sideburns that will interfere with the sealing surface	
F. This facial "shadow" (not clean-shaven) will interfere with the sealing surface of a half or full facepiece. It will also compromise a secondary seal inside a tight-fitting hood-style respirator. Degradation of fit can occur during cumulative work hours when an individual grows this amount of facial hair.	
G. Moustache is too thick and too long (down around edge of mouth); will contact a sealing surface and interfere with exhalation valve. Sideburns and/or heavy hair under the chin will prevent a good seal.	
H. Moustache is too thick and too long (down around edge of mouth); will contact a sealing surface and could get stuck in an exhalation valve. The hair on the rest of the face will interfere with a sealing surface.	
I. Hair is in sealing region and under the chin. Hair is in chin cup sealing region and on the side of the face.	
J. Moustache is too thick and too long; will contact a sealing surface and interfere with exhalation valve.	

Appendix D – Cleaning, inspection, maintenance and storage of respirators

(adapted from CSA standard Z94.4-11)

D-1.0 General

Each respirator shall be properly maintained to retain its original effectiveness. An acceptable program of care and maintenance shall include:

a) Cleaning and sanitizing;
b) Inspection, testing, and repair;
c) Storage;
d) Recordkeeping.

Defective or non-functioning respirators shall be identified as out of service or the equivalent (e.g., by being tagged) and shall be replaced or removed from service until repaired.

D-2.0 Cleaning and sanitizing

Respirators shall be cleaned and sanitized according to the respirator manufacturer's instructions. Respirators designed not to be cleaned shall be disposed after use as directed by the manufacturer.

Procedures for cleaning respirators

Respirators shall be cleaned as follows:

i. Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, pressure-demand valve assemblies, hoses, and any other components as recommended by the manufacturer. Discard or repair any defective parts
ii. Wash components in warm [43° C (110°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
iii. Rinse components thoroughly in clean, warm [43° C (110°F) maximum], preferably running water
iv. Drain
v. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for 2 min in one of the following:
    a. Hypochlorite solution (50 ppm of chlorine), made by adding approximately 1 mL of laundry bleach (5 to 6% chlorine) to 1 L of water at 43° C (110°F);
    b. Aqueous solution of iodine (50 ppm of iodine), made by adding approximately 0.8 mL of tincture of iodine (6 to 8 g ammonium or potassium iodide/100 cc of 45% alcohol) to 1 L of water at 43° C (110°F);
    c. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
vi. Rinse components thoroughly in clean, warm [43° C (110°F) maximum], preferably running water
vii. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces can result in adverse skin reactions (e.g., dermatitis). In addition, some disinfectants can cause deterioration of rubber or corrosion of metal parts if not completely removed
viii. Components should be hand-dried with a clean, lint-free cloth or air-dried
ix. Reassemble the face piece, replacing filters, cartridges, and canisters where necessary
x. Ensure that all components work properly in accordance with the manufacturer's instructions

When the respirator is not individually assigned, cleaning and sanitizing shall be performed before the next use.

D-3.0 Inspection

D-3.1 General

Users shall inspect their respirators before and after each use.

D-3.2 Inspection coverage

D-3.2.1 Respirator inspection coverage

Respirator inspection shall include, where applicable, the following:

a) Condition of component parts (e.g., face piece, helmet, hood, suit, head harness, valves, connecting tubes, harness assemblies, filters, cartridges, canisters, cylinders);
b) Tightness of connections;
c) End-of-service-life indicator;
d) Shelf-life dates;
e) Proper functioning of regulators, alarms, and other warning systems.

Respirators shall be inspected in accordance with the manufacturer's instructions. If they do not pass the inspection, the respirator shall be tagged and removed from service.

D-3.2.2 Inspection of cylinders and gauges

Pressure gauges of all breathing gas cylinders in service shall indicate that the cylinders are within the "Full" range. Cylinders with gauges indicating less than the "Full" range shall be recharged in accordance with the manufacturer's instructions.

D-3.3 Inspection of SCBA cylinders

D-3.3.1 General requirements for inspection of steel, aluminum, and fibre-reinforced cylinders

- A qualified person shall inspect cylinders externally and internally according to:
    1) CSA B339 and CSA B340;
    2) CGA (Compressed Gas Association) C-6, C-6.1, or C-6.2 as applicable;
    3) Applicable transport regulations;
    4) The manufacturer's instructions.

    Note: Visual internal inspections are required for all cylinders at the time of their hydrostatic testing; see C-6.0 for hydrostatic testing requirements
- All composite SCBA cylinders (e.g., fibreglass, Kevlar, carbon-wrapped, or hoop-wound) shall be removed from service no later than 15 years from their date of manufacture.
- Steel and aluminum cylinders over 15 years old shall have the interior of the cylinder inspected at least annually by a qualified person when these cylinders are in current use.
  Note: This does not extend the service life of cylinders.
- After each use of a cylinder and before it is refilled, a qualified person shall inspect its exterior for signs of external damage.

- Cylinders showing signs of external damage shall be immediately depressurized and removed from service and, prior to return to service, inspected in accordance with the requirements of C-3.3.1.1.
- Cylinders showing damage to the paint shall be inspected. If the damaged cylinders require repairs, they shall be carried out as soon as possible by a qualified person in accordance with the manufacturer's instructions and specifications.
- Cylinders stored in accordance with the requirements of Appendix D 5.4 shall be checked to ensure that the hydrostatic test date is current before the cylinders are returned to service.

D-3.3.2 Special inspection requirements for emergency-use SCBA

- SCBA shall be inspected on a schedule to ensure readiness for emergency use.
- A manager/supervisor shall maintain a written record of all inspections and service performed on SCBA and cylinder.

  The inspection records for emergency-use SCBA shall include:

  1) the date of use of the respirators and cylinders;
  2) the date of inspection;
  3) the physical condition of the respirators and cylinders;
  4) the cleaning and sanitizing of respirators;
  5) the repairs done to respirators and cylinders; and
  6) the tests performed on respirators and cylinders and remedial actions taken.

D-4.0 Repair and test

- Any used oxygen-generating canister shall be disposed of in accordance with the manufacturer's instructions. The spent CO2 sorbent in a closed-circuit apparatus shall be replaced or refilled after each use.
- Where inspections specified in Appendix D-3 indicate that repairs or rebuilding, or both, of a respirator or cylinder are required, such repairs and subsequent tests and checks shall be carried out in accordance with the manufacturer's instructions. Used respirators shall be reconditioned to accepted manufacturer's standards, and used SCBAs shall be reconditioned by the manufacturer or authorized service agents prior to use after ownership is transferred.
- Qualified persons shall repair and test respirators and cylinders, using original manufacturer's replacement parts and repair procedures.
- The frequency with which the pressure-regulating system of a respirator is rebuilt shall be governed by the manufacturer's recommendations and as inspection and performance require. SCBA shall not be modified to accommodate a resuscitator nor shall it be used as such.

D-5.0 Storage

Respirators shall be stored in a manner that will protect them against dust, ozone, sunlight, heat, extreme cold, excessive moisture, vermin, damaging chemicals, oils, greases, or any other potential hazard that can have a detrimental effect on the respirator.

Respirators shall be stored in a manner that will prevent deformation of rubber or other elastomeric parts.

Emergency-and rescue-use respirators placed in work areas shall be quickly accessible at all times and the storage cabinet, container, or holder shall be clearly marked.

D-5.1 Storage of cylinders not in current use

Cylinders not in current use and those in long-term storage should be stored at reduced pressure in the vertical position (valve up) and never inverted.

Notes:

- The reduction in pressure is important because corrosion attack is reduced in decreased-oxygen partial pressures. Vertical storage reduces the extent of corrosion by minimizing the interface between metal and water
- Because steel cylinders are more prone to corrosion activity, vertical storage of them at reduced pressure is especially important.

Whenever possible, cylinders should be stored indoors in a warm, dry environment.

Unpressurized cylinders should be stored with the main valve closed.

D-5.2 Rotation of cylinders in current use

Cylinders should be numbered, colour-coded, or arranged in a manner that ensures that all of them are used on a regular basis.

Note: Protective caps should be used to prevent physical damage to the cylinder valve threads and prevent dirt and moisture from entering the valve body.

Prior to using an SCBA cylinder that has not been used in any 12-month period, the air shall be discarded by slowly depressurizing the cylinder to the atmosphere and refilling it with compressed breathing air meeting the requirements of CSA Z180.1.

D-6.0 SCBA Cylinder Testing, Filling, Marking and Maintenance

At the University of Calgary, cylinders shall be filled, marked, and maintained by a qualified individual in accordance with manufacturer's recommendations and CSA B339 standards.

Cylinders shall be hydrostatically tested at a frequency and in the manner described in CSA B339 and CSA B340.

Note: Hydrostatic tests are required every 5 years for all SCBA cylinders.

Appendix E - References and Additional Resources

- Alberta Occupational Health and Safety Act, Regulation and Code http://humanservices.alberta.ca/working-in-alberta/307.html
- CSA Standard Z94.4-11 Selection, use, and care of respirators
- Hazard Assessment and Control Form (HACF) http://www.ucalgary.ca/safety/forms
- University Staff Wellness www.ucalgary.ca/staffwellness
- University Environmental Health and Safety Department www.ucalgary.ca/safety
- University's Respiratory Protection Program http://www.ucalgary.ca/staffwellness/respiratory_protection_program
    - On-Line Respiratory Protection Course https://cas.ucalgary.ca/cas/login?service=https://lmprd.ucalgary.ca/psp/lmprd/?cmd=start&ca.ucalgary.authent.ucid=true
    - Respirator Fit-Testing User Instructions https://www.ucalgary.ca/staffwellness/respiratory_protection_program