



RESPIRATORY PROTECTION

CODE OF PRACTICE

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1.0 Purpose

The University of Lethbridge Respiratory Protection Program (RPP) includes a Respiratory Protection Code of Practice, hazard management best practices and a system for conducting Health Surveillance of respirator users.

The purpose of the Respiratory Protection Code of Practice 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 which serve as a guideline to meet the UofL's respiratory protection requirements.

2.0 Scope

The Respiratory Protection Code of Practice (RPC) outlines the practices needed to control potential exposure to airborne contaminants. 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 (OHS) Act, Regulation and Code. This RPC is written in compliance with the Alberta Occupational Health and Safety (OHS) Act, Regulation and Code Part 18, and follows the guidelines of the Canadian Standards Association (CSA) Standard Z94.4 (current version) for the Selection, Use, and Care of Respirators.

3.0 Definitions

Air-line Respirator: a supplied air respirator through which breathable air is delivered to the worker via an air line. Air is supplied from a compressor or compressed air cylinder.

Air-purifying Respirator: removes contaminants from workplace air by passing it through a filter, a cartridge, or a combination of both, to provide protection from combinations of particulates, vapours, or gases.

Air-supplying Respirator: a respirator that supplies the respirator user with breathing air/gas from a source independent of the ambient atmosphere.

Assigned Protection Factor (APF): the anticipated level of respiratory protection that would be provided by a properly functioning respirator or class or respirators to properly fitted and trained users.

Clean-shaven: a worker has no facial hair that will interfere with an effective seal between the worker's face and the respirator face piece. In practical terms, the skin under the respirator seal must have less than one day of facial hair growth.

Compressed Breathing Air: is supplied atmospheric air under pressure of a quality that complies with CSA Standard Z180.1, Compressed Breathing Air and Systems, and does not contain a substance in a concentration greater than 10% of the applicable OEL.

Confined Space: means an enclosed or partially enclosed space that is not designed or intended for continuous human occupancy with a restricted means of entry or exit and may become hazardous to a worker entering it because of its design, construction, location or atmosphere; of the work activities, materials or substances in it; the provision of first aid, evacuation, rescue or other emergency response service is compromised; or of other hazards relating to it.

Fit Factor: a quantitative measure of the fit of a particular respirator to a particular individual.

Hazard: is a situation, condition, process, material or thing that may cause an injury or illness to a worker.

Hazard Ratio: is the estimated/measured airborne concentration of a substance divided by the occupational exposure limit; this ratio is calculated for each gas, vapour, and/or particulate component that poses a respiratory hazard.

Highest Hazard Ratio: is the highest calculated hazard ratio (HR) for any gas, vapour, and/or particular component that poses a respiratory hazard.

Immediately Dangerous to Life and Health (IDLH): means circumstances in which the atmosphere is deficient in oxygen or the concentration of a harmful substance in the atmosphere is an immediate threat to life; may affect health irreversibly; may have future adverse effects on health, or may interfere with a worker's ability to escape from a dangerous atmosphere.

Loose-Fitting Respirator: the face piece/visor of a respirator that forms a partial seal with the face, does not cover the neck and shoulders, and may or may not offer head and/or eye protection.

Occupational Exposure Limit (OEL): a maximum concentration of airborne contaminants deemed to be acceptable, as defined by Schedule 1 of the Alberta Occupational Health & safety Code.

Powered Air Purifying Respirator (PAPR): a full-face mask into which filtered air is pumped about 100-150 litres per minute (4-6 cubic feet per minute). The PAPR consists of a full-face mask, a battery pack, an air pump, high efficiency filter and hoses.

Qualitative Fit-Test (QLFT): a method of testing a respirator's face-to-face piece seal by injecting an agent such as saccharin or Bitrex™ inside a test chamber (enclosure hood) and subjectively determining whether the wearer detects the agent.

Quantitative Fit-Test (QNFT): a method of testing a respirator's face to-face piece seal using instrumentation that quantifies the actual protection factor provided by the respirator.

Respirator: personal protective equipment that protects a worker against the inhalation of airborne contaminants providing it is the correct type of respirator and is worn properly.

Respiratory Protective Equipment (RPE): all types of respirators and associated equipment that may be used to protect worker health

SCBA (Self Contained Breathing Apparatus): a respirator that provides breathing air from a compressed air cylinder, usually located on the wearer's back.

Supervisor: means the individual that directs or oversees a person, group, department, organization, or operation from the University of Lethbridge.

Tight-Fitting Respirator: a face piece inlet of a respirator that forms a complete seal with the face. This includes a half-face piece that covers the user's nose and mouth under the chin; and a full-face piece that covers the user's nose, eyes, and mouth under the chin.

User Seal Check: a fit check of a respirator by the respirator wearer, prior to use, to ensure that the respirator is positioned correctly and providing an effective seal. The field check is conducted according to the manufacturer's instructions before each use.

Worker: is any person engaged in work at or for the University of Lethbridge, including employees, contracted workers, volunteers, and graduate students.

4.0 Responsibilities

4.1 Senior Administration/Department Heads

- Upholds and supports the University of Lethbridge Safety Policy
- Supports the respiratory health and well-being of workers through this specific respiratory protection program
- Works with Campus Safety - Safety Services as program administrator to make provisions for this program

4.2 Supervisor

- 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 Form and ensure that Standard Operating Procedures (SOPs) are developed for tasks requiring respiratory protection and are referenced on the Hazard Assessment Form
- Communicate to workers any activities where respiratory protection has been identified as a control on their Hazard Assessment Form and any SOP
- Ensure that workers review the Hazard Assessment Form and are adequately trained in SOPs, 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 respirator selection as needed and respond to Safety Services request for employee names for respiratory 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 (such as new workplace machinery or work or something that may alter the shape of a worker's face), or respiratory hazards change
- Provide RPE as determined by the fit-test and ensure that all 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 trained every two years 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 Safety Services is notified if changes to a process, equipment, controls, chemicals used, or operating procedures have occurred to enable verification of appropriate RPE

4.3 Workers

- Comply with the Respiratory Protection Program requirements
- Participate in required training
- Review the Hazard Assessment Form 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 Safety Services 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

4.4 Campus Safety-Safety Services (Program Administrator)

- 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 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 (a Physician may be involved in SCBA or SAR)
- Inform necessary stakeholders (UofL's Wellness and Recognition for WCB, Alberta Health) if an employee has suffered injury or illness due to exposure;
- Fit test or arrange fit testing for 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;
- If conducting the Fit Testing, Safety Services will 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 Program list/group;
- Contact employees/supervisors for recalls for fit testing and relevant medical surveillance;
- Review and update the RPC and any other associated documents every two years or as required with changes to OHS regulations.
- 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 OHS legislation and maintaining best practices as per industry standards.
- When requested, RN will review submitted respirator selection forms part 1 and 2

- RN will document if the worker meets medical requirements with reported limitations, or does not meet medical requirements to use RPE and RN will review documentation and recommend a physical exam (if necessary) for employees requiring a respirator who have self-identified a relevant health condition;
- RN will communicate employee's ability to safely wear a respirator to EHS or Supervisor.
- Wellness & Recognition will refer to WCB as appropriate

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) and its cleaning and care (or safe disposal)
 - online training
 - fit testing

Hazard assessments should be reviewed and updated on a regular basis and when there is a change by Supervisors. Hazard assessments should be shared between supervisors and employees and should be used to create SOPs or training sessions. All hazard assessment, SOP reviews and training sessions should be documented with date, and employee signature of attendance.

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 (including health concerns affecting ability to wear respirator and shape of face or facial hair issues);

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
- Campus Safety- Safety Services Department Staff
- 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. For general inquiries, contact Safety Services for discussion/review. If an air monitoring incident, accident, near miss or illness occurs, worker or supervisor should fill out Campus Accident Incident Report (CAIR) and cooperate with Campus Safety in the incident review system. 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 Safety Services.

5.3 Pre-Fit Test Documentation

To initiate the fit testing process, the Respirator Selection Form (see Appendix A) must be completed by the worker with assistance from the supervisor as necessary for Part. Medical information does NOT need to be shared by worker with Supervisor. Medical Information is to be part of the review by medical professionals within the Safety Services department.

5.4 Training

- Employees are required to complete the online Respiratory Protection course prior to their fit testing session;
- Supervisors are responsible for ensuring that employees receive appropriate training for respirator use.
- Additional training may also be provided at Respiratory Fit Testing session.
- If training for specialized respiratory equipment (e.g. SCBA, Supplied Air Respirator, etc.) is required, employee or supervisor must contact Safety Services to arrange appropriate training;

5.5 Choose Appropriate Respirator

The appropriate respirator for use in a workplace should be based on the hazard assessment process conducted by Supervisors. Should additional information be needed, Safety Services can be contact to 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 respiratory fit test request form and the resulting fit test record. Specialty training sessions can be arranged by Safety Services to bring in an outside expert to assist supervisors to understand the appropriate respirator and the up-to-date equipment available.

5.6 Medical Review

The University of Lethbridge Respirator User Screening Form will be reviewed by the Safety Services with medical information reviewed specifically by the Occupational Health Nurse (OHN). The OHN determines if further medical review is required 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 and the respirator is required for the safety of their position. The accommodation process will involve input and liaison between the worker, the supervisor, Human Resources, Safety Services and a physician of the worker's choice.

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

- Will be required to work in an immediate danger to life and health (IDLH) 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 Safety Services or contracted services. Fit testing procedures will include:

- Brief 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 current version) 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;
- Confidential Medical Records will be stored in locked cabinet (paper) or in computer (encrypted) with non-confidential materials also in locked cabinet or computer (University supported firewall and protected systems)
- 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 Safety Services.

6.0 Use of Respirators

Respirator use is based on the current version of the **CSA standard Z94.4 Selection, use and care of respirators**.

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.

6.1 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 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.

6.2.0 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.

6.2.1 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 and request for exemption process.

6.2.2 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.

6.2.3 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.

6.2.4 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.

6.3 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.

6.4 Communications when using a respirator

The respirator face-to-face piece 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.

6.5 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 odor, experience resistance when drawing breath, or experience any irritation symptoms of the contaminant before the end of the change-out schedule, Safety Services 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.

6.6 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
- [C-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 Safety Services every two years or when changes to regulations occur. 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 in accordance with the University's Records Management Policy. Proof of training will be maintained in the supervisor's employee records. Maintenance records for equipment must

be retained as per manufacturers' recommendation and Alberta's OHS Code requirements.

Safety Services: Safety Services is responsible for maintaining respiratory fit testing records for employees. Records must be retained in accordance with the University's Records Management Policy.

Employee medical information will be stored by Safety Services in accordance with the University's Records Management Policy. Medical records for students will be retained by the student's health provider and not stored by Safety Services.

10. Related Documents

- UofL Respirator User Screening Form
- Hazard Management <https://www.uleth.ca/risk-and-safety-services/hazard-management>

Appendix A – Respirator Selection Process

Adapted from Alberta OHS Safety Bulletin: Respiratory Protective Equipment: An Employer’s Guide 2013

Figure 1. Choosing an Appropriate Type of Respiratory Protective Equipment

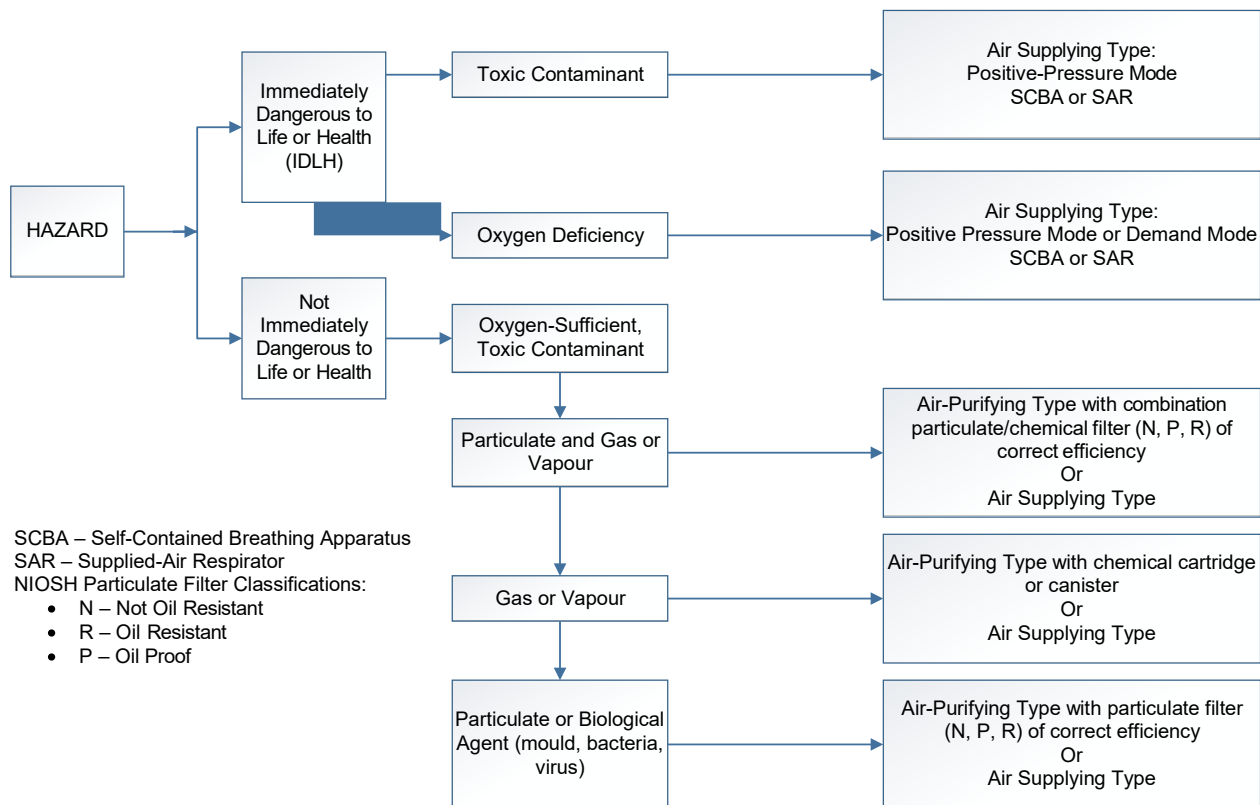


Table 1. Air-Supplying Respirators

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 <i>positive-pressure</i> ⁽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 <i>positive pressure</i> ⁽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. Air used for atmosphere-supplying respirators must be of a quality that complies with Table 1 of CSA Standard Z180.1-00, 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).
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, the assigned protection factor for demand-mode airline respirators and SCBA is 10.
3. Need not be fit tested.

Table 2. Air-Purifying Respirators

Type	Sub-Type	Assigned Protection Factor	Limitations
Non-Powered Air Purifying (NPAPR) Particulate Filter Chemical Cartridge or Canister Combination Particulate/Chemical	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.
	Full-Face Piece	50 ⁽²⁾	
	Half-Face Piece	50	
Powered Air-Purifying Respirator (PAPR)	Full-Face Piece	1000	*without simulated workplace protection factor study (SWPF); 1000 APF with a SWPF
	Helmet/Hood ⁽³⁾	25*	
	Loose-Fitting Face Piece ⁽³⁾	25	
	Half-Face Piece	50	

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 care 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






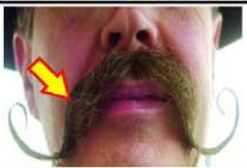
(CSA standard Z94.4-11)

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

<p>E. Soul patch that will interfere with the respirator seal in the chin area on elastomeric facepieces</p> <p>Facial hair and sideburns that will interfere with the sealing surface</p>	
<p>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.</p> <p>Degradation of fit can occur during cumulative work hours when an individual grows this amount of facial hair.</p>	
<p>G. Moustache is too thick and too long (down around edge of mouth); will contact a sealing surface and interfere with exhalation valve.</p> <p>Sideburns and/or heavy hair under the chin will prevent a good seal.</p>	
<p>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.</p> <p>The hair on the rest of the face will interfere with a sealing surface.</p>	
<p>I. Hair is in sealing region and under the chin.</p> <p>Hair is in chin cup sealing region and on the side of the face.</p>	
<p>J. Moustache is too thick and too long; will contact a sealing surface and interfere with exhalation valve.</p>	

Process for Exemption Requests for Respirator Use and Facial Hair Issues

- 1) **Employee is verbally and in a dated and written letter outline the request for exemption to their supervisor (that is, outline the issues that bring the employee to request an exemption to the clean shaven requirement for respirator use).**
- 2) A supervisor is to review the request for exemption and ensure that the hazard assessments for the department are up to date and the job descriptions and resultants requirements are reviewed.
- 3) If the supervisor has reviewed job descriptions, job requirements, hazards and respiratory protection and believes that safety of the worker or other workers is not at risk, the supervisor may meet with the employee and discuss the exemption and the resulting accommodation. Ultimately, the exemption request **MUST** be responded to by the supervisor to the employee in writing. the supervisor will respond to the request of the worker outlining acceptance of the exemption **AND** any issues that may need to be addressed as a result of the exemption (examples: what the employee should do when requested to don a respirator for a task that he/she is unable to do safely without a properly fitting respirator, or job description changes etc).
- 4) A supervisor may need to review job hazards and the need for respiratory protection with Campus Safety-Safety Services and should contact Safety Services at safety.services@uleth.ca for such a review. An alternative **may** exist for certain respirators and certain hazards but this must reviewed with Safety Services and the safety of the worker and other workers must be reviewed and considered.
- 5) A supervisor may need to review the request for exemption with Human Resources to ensure that the request for exemption does not require further documentation (physician note) or to ensure no discrimination occurs in the review of the reason for exemption.
- 6) If the supervisor has reviewed job descriptions, job requirements, hazards and respiratory protection and believes that safety of the worker or other workers is at risk, the supervisor shall work with Human Resources to respond to the worker's request for exemption in writing with an outline of the reason for not accepting the exemption. The employee will be requested to wear an appropriate respirator for the hazards in the workplace and/or be clean shaven for the appropriate respirator (see University of Lethbridge Respiratory Protection Program Appendix for appropriate facial hair for respirator use).

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 requirements

D-3.2.1 Respirator inspection procedure

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., fiberglass, 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 Lethbridge, 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 <https://www.alberta.ca/ohs-act-regulation-code.aspx>
 - CSA Standard Z94.4-11 Selection, use, and care of respirators http://work.alberta.ca/documents/WHS-PUB_ppe001.pdf
 - University of Lethbridge Safety Services <https://www.uleth.ca/risk-and-safety-services>
 - Wellness & Recognition www.uleth.ca/hr/wellness
University of Lethbridge Campus Safety <https://www.uleth.ca/campus-safety>
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