

# Respiratory Protection Program

Risk and Safety Services (RSS)  
Oct. 2024



## Purpose

The purpose of this document is to outline the requirements of Thompson Rivers University's (TRU) Respiratory Protection program. The intent of this program is to proactively identify respiratory hazards and provide controls including personal protective equipment to prevent respiratory injuries and illnesses at TRU. TRU is committed to providing the necessary resources, training, and practices to protect against airborne contaminants. In addition, this program is meant to increase the awareness of respiratory hazards and to inform employees of means available to protect themselves and others from those hazards.

This program is applicable to all employees, contractors, visitors, and students who may take part in or conduct activities where respiratory hazards are present at TRU.

## Roles and Responsibilities

### The University acting through administrative heads is responsible for:

- Providing a safe, healthy, and secure working environment.
- Ensure adequate resources are available to implement appropriate procedures and controls to prevent respiratory hazards.
- Provide support to the Inspectors, Departments, Supervision, and RSS in the implementation and management of the Respiratory Protection Program.

### Office of Safety and Emergency Management Responsibilities:

- Develop and maintain the Respiratory Protection Program.
- Liaison with the executive team as necessary to ensure resources required to support the program are available.
- Collaborate, and assist the departments in the identification of respiratory hazards and its controls including selection of respirators and cartridges.
- Provide and assist with the identification, selection and implementation of various controls as required.
- Ensure appropriate training is provided for all those involved in both the Respiratory Protection Program as well as the proper fit and use of respirators.
- Ensure records are kept of all training, education and fit testing documents.
- Follow up on program compliance and work with the TRU community to ensure continual improvement of the program.

### Supervisor/ Manager/ Dean/ Faculty/ Researcher (supervising and/or teaching students) \* responsibilities:

\*For simplicity, all the above positions will be referred to as supervisor or supervision in this document.

- Identify situations, chemicals, tasks, environments where respirator protection maybe required.
- Use the hierarchy of controls to minimize exposure to respiratory hazards (eliminate, substitute, engineering controls, administrative and finally personal protective equipment).
- Ensure effective control measures are in place and if required, are properly used by employees.
- Take part in, and support employee participation, in the respiratory protection program including screening, medical assessments, training, selection, fit testing, and all other related procedures, whenever required and practicable.
- Ensure respirators are cleaned, sanitized, inspected, maintained, repaired, and stored in accordance with training and manufacturer's recommendations.
- Maintain all records (such as training records, inspection forms, corrective actions implemented, action logs etc.) for department and employees as required.
- Reasonably review all recommendations regarding respirators and other controls from stakeholders including RSS, employees, and the Joint Occupational Health and Safety Committee (JOHSC).
- Ensure all under their supervision wear appropriate respiratory protection at all times in respiratory hazard areas.

### **Worker and Respiratory Protection Users Responsibilities**

- Follow all requirements of the Respiratory Protection Program for record keeping, corrective action reporting and follow up reporting including participation in annual fit testing.
- Wear the approved, and appropriate respiratory protection at all times when performing tasks or working in an area where respiratory hazards exist.
- Inspect the respirator before use as per the training received.
- Clean, maintain and store respirators as per training received and the manufacturer's instructions.
- Perform negative and positive pressure check after each donning of a tight-fitting respirator.
- Report any damage, malfunction or any change that may impact the ability to safely use a respirator to their supervisor.
- When using a tight-fitting facepiece respirator, be clean shaven and ensure that no object or material interferes with the seal or operation of the respirator.
- Use the respirator in accordance with the written instructions and training received.

## General Requirements

### Monitoring

Departments will identify environments and tasks where there may be a risk of exposure to hazardous air contaminants or oxygen deficiency. This can be completed as a part of a hazard assessment process or a task review to determine if workers are potential exposed to respiratory hazards during routine tasks.

Departments will work with RSS to ensure that workplace monitoring is done to assess the risks in any area where workers are exposed to hazardous air contaminants. The decision to perform workplace monitoring will be based on:

- A hazard assessment of the environment and/or task.
- A review of Safety Data Sheets.
- Injury/illness or near miss reports.
- Reports, feedback, or trends from similar environments or fields.
- Reports, observations, and discussions from employees.
- Consultation with the JOHSC.

Specific precautions such as an Exposure Control Plan (ECP) will be developed for any substances identified at TRU that are listed as a designated substance or referred to by the WorkSafeBC Regulation as carcinogens, sensitizers, reproductive toxins.

### Requirements for Respirator Use

Respiratory Protection will be required to be worn when:

- exposure to an air contaminant exceeds an 8-hour TWA limit, ceiling limit or short-term exposure limit as set by WorkSafeBC / the ACGIH;
- there is risk of accidental exposure due to process upset, such as a chemical spill or gas leak.

### Respiratory Selection

Respiratory selection will be done in consultation with affected workers, and the appropriate Joint Occupational Health and Safety Committee. This selection process will also include the Respirator Selection Form listed in Appendix A. The respirator selected must be appropriate to the contaminant, its concentration, and the level of protection provided by the respirator (i.e., the protection factor and maximum use concentration). Only respirators approved by NIOSH/MSHA (U.S. Mine Safety and Health Administration) or as any other respirators acceptable to WorkSafeBC will be provided to or utilized by employees or workers at TRU.

This process must include the appropriate selection of cartridges, or filters, and/or any other required piece of equipment to be used in conjunction with the respirator.

## Fit testing

Fit testing is required for all respirators that are designed to fit to the face, such as half face or full-face mask, which also requires an effective seal. Fit testing will meet the requirements of *CSA Standard CAN/CSA-Z94.4-02, Selection, Use, and Care of Respirators*. Respiratory users are required to be clean shaven in the areas where the respirator seals with the face including no visible stubble. Fit testing will be conducted once a year for all employees at TRU who wear a respirator.

RSS will communicate with departments when annual fit testing is scheduled, and departments will be responsible for notifying their employees. Employees will be responsible for their scheduling, attending with their respirator(s)/PPE, and providing RSS and their departments with their fit test records. Each department is responsible for purchasing the required respirator(s)/PPE for their employees.

## Cleaning, Maintenance, and Storage of Respirators

Respirators will be maintained, cleaned, and stored as described by the manufacturer's instructions. Defective respirators are not to be used. If an employee finds a fault or defect in a respirator during an inspection, they are to report to their supervisor for repair or replacement. All supplies of replacement parts, filters, cartridges, etc. are to be provided by the respiratory user's department. After inspection, cleaning, and/or any necessary repairs, respirators will be properly stored in plastic bags/sealed containers and then in, storage cabinets, and/or lockers.

Specific practices and procedures are developed in Appendix D - General Respirator Procedures for general respirator usage at TRU.

## Proper Use of Respirators

Respirators are to be used in accordance with all manufacturer guidelines and WorkSafe BC requirements. Proper use guidelines include:

- Corrective eyewear or other equipment should not interfere with the seal of the respirator.
- No covering can be used which passes between the respirator facepiece and the wearer's face.
- Respirators will be inspected before and after every use. Straps, valves, cartridges, other respirator parts, and general cleanliness will be checked. See the respirator instruction manual.
- User seal checks will be performed by respirator users each time they put on their respirators.
- Respirators which require a face seal also require all users to be clean-shaven where the respirator seals with the face.

When wearing respirators, users experiencing any of the following are to suspend the task, leave the work area and report to their supervisors and/or OSEM:

- Resistance to breathing
- Nausea
- Dizziness
- Irritation
- Unusual odour or taste
- Excessive fatigue
- Difficulty breathing

An investigation is to be completed before the activity is to resume. Respirators are to be checked, with filters or cartridges to be replaced.

An employee experiencing concerns with a respirator will report concerns to their supervisor and RSS. If there is any question about the employee's ability to wear a respirator, People and Culture will be involved in an accommodation process, the employee is to be examined by a physician and appropriate controls will be put in place.

At this time, there is no expectation of supplied air respirators being used in the course of work at Thompson Rivers University. Any routine or non routine tasks which require supplied air respirators to be used will involve RSS, and appropriate plans will be developed. All plans will meet the requirements of WorkSafe BC and the *CSA Standard CAN/CSA-Z180.1-00, Compressed Breathing Air and Systems*.

## Safe Work Procedures

Safe work procedures are to be developed and followed for the use of all respiratory equipment and tasks with respiratory hazards. Safe work procedures have been created and are listed in Appendices - D General Safe Work Procedures for all generic tasks associated with respirator use, including:

- Cleaning of Respirators
- Storage
- Cartridge/cannister service life
- User Seal check
- Positive seal check
- Negative seal check

## Education and Training

All employees at TRU will be made aware of the Respiratory Protection Program. However, only those employees who are at risk of air borne containments or are involved in the control of respiratory hazards will be trained. TRU will ensure that all training includes competency in:

- Potential hazards (airborne contaminants) and exposure.
- Basic knowledge of respirators such as types, limitations, care, use, storage, inspection, and maintenance.
- Fit testing; the purpose and limitations.
- The Respiratory Protection Program.
- The specific requirements at TRU.

Re-training on both the basic Respirator Knowledge and on TRU's Respiratory Protection program will be provided on an on-demand basis to Employees required to use respiratory protection in their roles. Re-training may also be conducted be necessary if:

- There is a change in regulatory requirements regarding respirators.
- There are significant changes to the program and procedures at TRU.
- A supervisor or management has reason to believe, an employee requires retraining, such as reason to believe that the employee has deviated from their training or this program.

RSS will make every effort to remind departments and faculties when recertifications and expiry dates are occurring. But all training (and fit testing) records related to respirators are to be managed by the department in which the activities take place. All training records should still be sent to the RSS for tracking and compliance purposes.

## Annual Review

On an annual basis, RSS will complete a formal review of the Respiratory Protection Program to ensure it is up to date and working effectively. The JOHSC may be consulted as a part of this review process. This review may also take place at any time if:

- A change in regulatory requirements could affect this program or procedures.
- Aspects of this program or its procedures are reported to be working ineffectively.

## Revision Control

<b>Date of Revision:</b>		<b>Position of Approver:</b>		<b>Signature:</b>	
August 2021		Manager, Health, Safety & Environment			
<b>Version:</b>	<b>Author:</b>	<b>Date:</b>	<b>Description of Version:</b>		
1	Health & Safety Advisor	May 2022	First Draft		
2	Safety Technician	March 2023	Second Draft		
3	Safety Advisor	Oct 2024	RSS update		

## Definitions

1. **Air-Purifying Respirator** – a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminations by passing ambient air through the air purifying element.
2. **Assigned Protection Factor (APF)** – the level of protection that a particular type of respirator can be expected to provide 95% of the time. For example, a respirator with APF of 10, means that when worn correctly that respirator can be safely used in atmospheres that has a hazardous concentration of up to 10 times the occupational exposure limit (TWA/STEL/Ceiling). WorkSafe BC Table 8.1: Respirator Protection Factors can be found in Appendix C
3. **Exposure Control Plan (ECP)** – a plan created to control worker exposure to materials that can cause negative health effects, most of which are regulated by WorkSafe BC.
4. **Fit Factor** – is the number as a direct result of a quantitative respirator fit test. It is the measurement made by the instrument during the fit test.
5. **Fit Test** – The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual
  - a. **Qualitative Fit Test (QLFT)** – A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent
  - b. **Quantitative Fit Test (QNFT)** – An assessment of the adequacy of the respirator fit by numerically measuring the amount of leakage into the respirator
6. **Hazard Ratio** – is used to determine the level of protection required for a specific task and is determined by dividing the exposure level by the APF.
7. **Immediately Dangerous to Life or Health (IDLH)** – An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.
8. **MUC (Maximum use concentration)** - the maximum concentration of a specific contaminant that a given respirator will protect a worker. Determined by multiplying the exposure limit by the protection factor of the chosen respirator.
9. **Occupational Exposure Limits** - the maximum concentration of chemicals a worker can be exposed to in a given time (STEL refers to short term exposure (15 minutes) or TWA which is the time weighted average over an 8-hour shift and the Ceiling limit is the maximum concentration a person can be exposed to, regardless of the length of time of the exposure.
10. **Oxygen Deficient Atmosphere** – An atmosphere with an oxygen content below 19.5% by volume



# Appendix A- Respirator Selection Form

Respirator Selection Information Form		
Process or Task related Information		
Work area location:	_____	Date: _____
Work area characteristics (open area, confined space, etc.):	_____	_____
Location of hazardous area relative to safe area:	_____	_____
Work description/ operation:	_____	_____
Anticipated length of time that respirator will be used:	_____	
Worker activity level (light, moderate or heavy):	_____	
Information for each Breathing Hazard		
Step 1:	Oxygen level (if below 19.5%, air-purifying respirators cannot be used)	%
Step 2:	Air contaminant and concentration	
Step 3:	8-hour TWA limit	
Step 4:	IDLH concentration	
Step 5:	Can the contaminant cause eye irritation?	
Step 5:	Can the contaminant irritate skin or be absorbed through the skin?	
Step 6:	Respirator under consideration and assigned protection factor (APF)	
Step 7:	Hazard ratio (minimum protection factor)	
Step 8:	Maximum use concentration (MUC)	
Step 9:	Air-supplying or air-purifying respirator?	
Step 10:	State of contaminant	

Step 11:	Adequate warning properties (odour, irritation, etc.)?	
<b>Recommended approved respirator(s):</b>	<hr/> <hr/> <hr/> <hr/>	
<b>Recommended approved filter or cartridge:</b>	<hr/> <hr/> <hr/> <hr/>	
<b>Other protective equipment required:</b>	<hr/> <hr/> <hr/> <hr/>	
<b>Name of Participants attending:</b>	<hr/> <hr/> <hr/>	
<b>Signature of participants</b>	<hr/> <hr/>	<hr/> <hr/>

## Appendix B - General Safe Work Procedures

### Respirator Cleaning

Respirators will be maintained, cleaned, and stored as described by the manufacturer's instructions.

The following procedure can be used to clean and sanitize most respirators:

1. Remove any filters, cartridges, or canisters.
2. Wash the respirator (and associated parts) in warm water mixed with a mild detergent (or a mild detergent plus bleach).
3. Rinse the respirator in clean, warm water.
4. Wipe the respirator with disinfectant wipes (70% isopropyl alcohol) or a sanitizing foam to kill germs.
5. Air dry in a clean area.
6. Reassemble the respirator (e.g., replace the cartridges).
7. Place in a clean, dry plastic bag (or container).

### Respirator Storage

Each respirator must be stored in a container to protect it against dust, sunlight, chemicals, oils and grease. Workers must ensure that the respirator is placed in its storage container when not in use.

If the respirator is being stored with the cartridge or canister attached, it must be placed in a resealable plastic bag or other sealable container to ensure the cartridges will not continue to absorb material while in storage.

Respirators are not stored with tools or other heavy objects that can deform the respirator. Over time this deformation can become permanent.

Respirators are to be positioned in the storage container so that the face piece, hoses, and head straps are not bent or stretched.

Respirators should not be stored in direct sunlight, or near a heat source.

Respirators should not be exposed to excessive cold when being stored. This can cause damage to the respirator.

If the respirator will be exposed to excessive moisture it must be placed in a sealed plastic bag inside of its storage container.

### Cartridge and Canister Service Life

Unless respirator cartridges and canisters are stored in sealed containers, they will continue to absorb contaminants while in storage. It is impossible to tell by looking at it

how much contaminant a cartridge / canister has absorbed. Some cartridges have an end-of-service-life indicator that will alert the wearer when the sorbent material has been used up. For all other cartridges and canisters replacement will be done every six months or be based on manufacturer recommendations or a schedule as determined by the department. The OSEM can provide support in the development of this schedule.

There may be some obvious signs that a cartridge needs to be changed, e.g., replace the cartridge if breathing becomes difficult, and if smell or taste of the contaminant can be detected.

## User Seal Check

When you are satisfied that you have found a respirator that fits, there are two simple checks to test the seal. You must do seals checks each time you put on your respirator. Before doing any seal check, make sure your respirator has all its inlet and exhaust valves. Make sure that the valves are in good condition and lie flat. Doing these checks will help you tell whether you have a good seal and whether the valves are in place and working.

If the respirator is to be used with any other personal protective equipment – such as goggles, hearing protection, or a hard hat – all seal checks must be done while you are wearing this equipment.

## Negative-Pressure User Seal Check

This test is called a “negative-pressure” user seal check because you create a slightly negative air pressure inside the respirator facepiece by inhaling. Follow these instructions:

1. Put on the respirator and other associated personal protective equipment. Tighten the head straps until the respirator feels snug but comfortable. Wear the respirator for a few minutes so that it will warm up and conform to your face better.
2. Close off the inlet opening of the cartridges or filters by covering them gently with the palms of your hands, a plastic bag, a special adapter, or gloves (in some cases, you may have to remove the cartridges so you can cover the inlet valves). If you are carrying out this test while wearing a PAPR or an air-supplied respirator, close off or disconnect the hose to stop the air flow.
3. Breathe in slightly to create a vacuum.
4. Hold for 10 seconds.
5. If you have a good seal, the facepiece should collapse slightly against your face and stay collapsed. No air should leak into the facepiece past the sides, top, or bottom.



If the facepiece does not collapse and stay collapsed, then there is an air leak. Check the inhalation valve(s) and try repositioning the respirator on your face and adjusting the head straps or inspect and change the filters if necessary. Carry out the negative-pressure seal check again. If you cannot get a seal after a few attempts, notify your supervisor, and try the negative-pressure check with a new mask that is the same size, model, and manufacturer.

## Positive-Pressure User Seal Check

This test is similar to the negative-pressure user seal check except that you breathe out slightly while gently covering the exhaust valve with your palm. This creates positive pressure in the facepiece. If you have a good seal, the facepiece will bulge or puff out slightly from your face. Again, no air should leak past the sides, top, or bottom of the respirator.

1. Put on the respirator and other associated personal protective equipment. Tighten the head straps until the respirator feels snug but comfortable. Wear the respirator for a few minutes so that it will warm up and conform to your face better.
2. Close off the exhaust valve opening by covering it with the palm of your hand.
3. Breathe out slightly to force air into the facepiece.
4. Hold for 10 seconds.
5. If you have a good seal, the facepiece should bulge out and stay out. No air should leak out of the facepiece past the sides, top, or bottom.



If the facepiece does not bulge out and stay out, then there is an air leak. Check the exhalation valve and try repositioning the respirator on your face and adjusting the head straps or inspect and change the filters if necessary. Carry out the positive-pressure seal check again. If you cannot get a seal after a few attempts, notify your supervisor, and try the positive-pressure check with a new mask that is the same size, model, and manufacturer.

## Appendix C – Assigned Protection Factors

Respirator type	Protection Factor
<b>Air purifying</b>	
Half facepiece, non-powered	10
Full facepiece, non-powered	50
Full facepiece, powered (PAPR), equipped with HEPA filters for exposure to asbestos	100
Full facepiece, powered (PAPR), equipped with HEPA filters and/or sorbent cartridge or canister for exposure to contaminants other than asbestos	1 000
Loose-fitting facepiece, powered (PAPR)	25
Hood or helmet facepiece, powered (PAPR), and equipped with a HEPA filter or a sorbent cartridge or canister or both a HEPA filter and a sorbent cartridge or canister, if section 8.34 (5) applies	25
Hood or helmet facepiece, powered (PAPR), and equipped with a HEPA filter or a sorbent cartridge or canister or both a HEPA filter and a sorbent cartridge or canister, if the conditions set out in section 8.34 (4) are met	1 000
<b>Air supplying</b>	
<b>Airline - demand (negative pressure)</b>	
Half facepiece	10
Full facepiece	50
<b>Airline - continuous flow</b>	
Loose-fitting facepiece/hoods	25
Half facepiece	50
Full facepiece	1 000
Helmet/hood	1 000
<b>Airline - pressure demand (positive pressure)</b>	
Half facepiece	50
Full facepiece	1 000
Full facepiece, with egress bottle	10 000
<b>Self-contained breathing apparatus (SCBA)</b>	
Demand (negative pressure)	50
Pressure demand (positive pressure)	10 000
Other factors such as warning properties, IDLH levels, and cartridge/canister limitations must also be taken into account when determining the maximum use concentration. Refer to the manufacturer's instructions and standards acceptable to the Board for further information.	