



UNIVERSITY OF
TORONTO

RESPIRATORY PROTECTION PROGRAM

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1.0 INTRODUCTION AND SCOPE

Although elimination or reduction of respiratory hazards through substitution or engineering controls is preferred, there may be instances in which University workers require the use of appropriate respiratory protection for work, which involves exposure to potentially hazardous environments, such as airborne contaminants (dusts, fumes, mists, gases, vapours, aerosols, airborne pathogens) or oxygen-deficiency. The Canadian Standards Association (CSA) Standard Z94.4-18 (*Selection, Use and Care of Respirators*) requires a written respiratory protection program to be in place where respiratory protection is used to protect workers from inhaling hazardous atmospheres.

The basic elements of the Respiratory Protection Program are:

- 1) Roles and responsibilities;
- 2) Hazard assessment;
- 3) Respirator selection;
- 4) Provision of respirator fit testing;
- 5) Provision of training in the proper use of respiratory protection;
- 6) Provision of appropriate procedures for cleaning, inspecting, maintaining and storing respirators;
- 7) Provision of medical surveillance for workers using respiratory protection;
- 8) Provision for evaluating the effectiveness of this program;
- 9) Maintenance of training, fit testing, and medical surveillance records;
- 10) Manage external contractors performing work in environments that require the use of respiratory protection.

1.1 Program Objective

The objective of this program is to protect the health of all workers coming into contact with hazardous atmospheres, where there is no possibility of implementing engineering or work practice/administrative controls. In addition, this program is meant to increase the awareness of respiratory hazards in the workplace and to inform employees of the means available to protect themselves and others from those hazards.

1.2 Scope

This program applies to any staff, faculty, student or visitor who may be exposed to respiratory hazards during the course of work at the University.

Note: In this program, "worker" includes faculty, staff, students and visitors.

2.0 DEFINITIONS

Accepted respirator – a respirator tested and certified by procedures established by the National Institute for Occupational Safety and Health (NIOSH).

Air-purifying respirator – a respirator with an air-purifying filter, cartridge, or canister that removes specific contaminants by passing ambient air through the air-purifying element.

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

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

Bioaerosol – a liquid droplet (generated, for example by coughing, sneezing or a medical procedure) or a solid particle (generated, for example, by sweeping or shovelling) suspended in air and that is living or originates from living organisms. Bioaerosols include living or dead micro-organisms, fragments, toxins, and particulate waste products from all varieties of living things. They are capable of causing infection, adverse or allergic responses.

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

Hazardous atmosphere – any atmosphere that is oxygen-deficient, exceeds occupational exposure limits, presents a fire/explosion hazard, and/or contains an airborne toxic or disease-producing contaminant in concentrations deemed to be hazardous.

Health Care Professional – an individual who is licensed by a provincial licensing authority or equivalent to practice medicine or nursing and who possesses relevant experience and knowledge in the field of occupational health and safety.

Immediately dangerous to life or health (IDLH) atmosphere – an atmosphere that poses an immediate threat to life, would cause adverse health effects, or would impair an individual's ability to escape.

Qualified Person – an individual who possesses the knowledge, experience, and training to fulfil the competencies of the roles defined in this Program.

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.

Respirator – a device that is tested and certified by procedures established by testing and certification agencies (i.e. NIOSH) and is used to protect the user from inhaling a hazardous atmosphere.

Service Life – the period of time during which a respirator provides adequate protection to the user.

Tight-fitting facepiece – a respirator inlet covering that forms a complete seal with the face. This includes a half-facepiece that covers the user’s nose and mouth under the chin and a full-facepiece that covers the user’s nose, eyes, and mouth under the chin.

User seal check – an action conducted by the respirator user to determine if the respirator is properly sealed to the face.

3.0 RESPONSIBILITIES

3.1 Supervisors/Principal Investigator and All Others in Authority

Supervisors/Principal Investigator and all others in authority shall:

- Identify situations where respirators are required;
- Conduct, in consultation with Environmental Health and Safety (EHS) when necessary, assessments for respiratory hazards;
- Determine the type of respiratory protection required for the specific respiratory hazard. Consult EHS when necessary;
- Ensure that user screening, training and fit testing, and, where required, medical assessments are completed prior to assigning a worker any task that requires the use of a respirator;
- Provide workers with appropriate respiratory protection;
- Ensure workers use the respirators in accordance with the instructions, the training received, and the safe operating procedures established for the workplace;
- Ensure workers wear appropriate respiratory protection at all times in respiratory hazard areas;
- Ensure that workers use only those respirators for which they have been trained and fit-tested for;
- Ensure respirators are cleaned, sanitized and decontaminated when required, inspected, maintained, repaired, and stored in accordance with training and manufacturer's recommendations;
- In case of a tight-fitting facepiece, ensure respirator users are clean-shaven and do not have any object or material that would interfere with the seal or operation of the respirator;
- Notify EHS of respirator users' concerns, changes in processes, equipment, or operating procedures that have an impact on environmental conditions, and respiratory protection requirements;
- Notify EHS of incidents where the use of a respirator may have prevented or contributed to an accident or injury; and
- Provide details of the type of respirator selected and the anticipated working conditions to the health care professional conducting the medical assessment of a respirator user.

3.2 Respirator Users

Respirator Users shall:

- Wear appropriate respiratory protection at all times when performing tasks or working in an area where respiratory hazards exist;
- Inspect the respirator to ensure it is clean and in good operating condition prior to each use and at intervals that will ensure that it continues to operate effectively;

- Clean, maintain and store the respirators in accordance with the training received and the manufacturer's instructions;
- Perform negative and positive pressure/seal checks after each donning of a tight-fitting respirator;
- Remove from service any respirator that they determine to be defective and report it to their supervisor;
- Report to their supervisor or other person in authority any condition or change that may impact their ability to use a respirator safely;
- 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; and
- Use the respirator in accordance with the manufacturer's instructions, written instructions and training received.

3.3 Environmental Health and Safety (EHS)

The Occupational Health and Safety section of EHS is responsible for all aspects of the Respiratory Protection Program. This includes:

- Developing and administering the program;
- Providing technical advice and recommendations regarding assessments for respiratory hazards;
- Assisting supervisors in determining the type of respiratory protection required for the specific respiratory hazard(s);
- Providing training and education;
- Providing respirator fit testing;
- Evaluating effectiveness of the Respiratory Protection Program;
- Ensuring that procedures for health surveillance are established;
- Updating the program to maintain consistency with regulatory criteria and consensus standards; and
- Creating and maintaining training and fit testing records;

3.4 Occupational Health

Occupational Health shall:

- Have knowledge of the health effects associated with the respiratory hazards to which the user might potentially be exposed;
- Have knowledge of the physiological burden and psychological stresses associated with the use of the selected respirator under the anticipated working conditions;
- Assess the suitability of the user to safely use the selected respirator;
- Determine what tests, evaluations, etc., are necessary to make the determination whether an employee is medically fit to wear respiratory protection equipment;
- Report to the program administrator whether the user

- meets medical requirements;
- meets medical requirements with limitations, or
- does not meet medical requirements to use the selected respirator;
- Perform medical surveillance, as appropriate, for specific hazardous respiratory toxins, allergens, or pathogens; and
- Maintain medical records.

4.0 HAZARD ASSESSMENT

A hazard assessment shall be performed by the supervisor to determine the respiratory hazards present and to assist in the selection of an appropriate respirator where required. EHS can be consulted if necessary to provide assistance with the hazard assessment. The assessment of a respiratory hazard includes the following:

- Identify what contaminants (chemical, biological) are present in the workplace;
- Identify the physical states of all airborne contaminants;
- Determine the likelihood of inhalation of the contaminants;
- Measure or estimate the concentration of the contaminants;
- Determine if the atmosphere is potentially oxygen deficient;
- Identify an appropriate occupational exposure limit for each airborne contaminant;
- Determine if the atmosphere is immediately dangerous to life or health (IDLH);
- Determine if there is an applicable regulation or a substance-specific standard for each contaminant and whether it prescribes a specific respirator;
- Determine for particulate hazards if there is oil present; and
- Determine if the contaminant can be absorbed through, or is irritating to, the skin or eyes.

To continuously confirm that the proper type of respirator is being used, the risk assessment shall be repeated:

- a) on a regular basis;
- b) when materials, control measures, processes, or tasks are modified; or
- c) when new information becomes available.

5.0 RESPIRATOR SELECTION

Respirator selection shall be based on a systematic review of the hazards and knowledge of standards, regulatory criteria, and manufacturer information on the types of respirators and their limitations to ensure that appropriate respirators are selected for the intended conditions of use.

For the purpose of selection, respirators shall be grouped as follows:

- a) atmosphere-supplying respirators:
 - i. Self-contained breathing apparatus (SCBA) (pressure-demand, open or closed-circuit);
 - ii. airline or supplied air breathing apparatus (SABA) (pressure-demand or continuous-flow); and
 - iii. multi-functional (a configuration incorporating both SCBA and airline);
- b) air-purifying respirators (APR), non-powered and powered (PAPR):
 - i. gas- and vapour-removing;
 - ii. particulate removing;
 - iii. gas-, vapour-, and particulate-removing; and
 - iv. multi-functional (a configuration incorporating both APR and PAPR);
- c) combined respirator (a configuration incorporating both atmosphere-supplying and air-purifying); and
- d) escape-only respirators (atmosphere-supplying or air-purifying).

5.1 SELECTION OF RESPIRATORS FOR PROTECTION AGAINST NON-BIOAEROSOL WORKPLACE CONTAMINANTS

1. Respirators shall be selected based on the following criteria:
 - Health of the worker and ability to wear a respirator;
 - Review of the hazard assessment;
 - Existing legislation and standards;
 - Work requirements and conditions;
 - Duration of exposure;
 - Characteristics and limitations of respirators; and
 - Respirator assigned protection factors (Appendix C).
2. Only accepted (NIOSH-approved) respirators shall be selected and used.
3. Respirators shall be selected by supervisors in consultation with EHS (when necessary).
4. Guide to Respirator Selection flowchart (Figure 1) can be used to assist in the selection of an appropriate respirator.
5. Workers shall be issued and use only those respirators for which they have been fit-tested and medically approved.

6. For air-purifying respirators for gases and vapours with no end-of-service-life indicator, the supervisor shall establish a change-out schedule for the replacement of the cartridges (based on manufacturer information). Should the need arise, EHS can assist the supervisor with setting up the change-out schedule.
7. Where an IDLH atmosphere is identified, only pressure-demand self-contained breathing apparatus (SCBA) or a combination pressure-demand supplied air respirator with auxiliary self-contained air supply, with a minimum rated service time of 15 minutes shall be used.
8. Respirators approved for escape only shall not be used for non-emergency applications.
9. Atmosphere-supplying respirators that make use of compressed air for breathing shall meet CSA Standard Z180.1-19 Compressed Breathing Air and Systems.
10. Atmosphere-supplying respirators that make use of ambient breathing air system shall meet CSA Standard Z180.1-19 Compressed Breathing Air and Systems.
11. Workers that require an atmosphere-supplying respirator must notify EHS and receive additional training.

5.2 SELECTION OF RESPIRATORS FOR PROTECTION AGAINST BIOAEROSOLS

1. Where regulations exist, including occupational exposure limits, they take precedence in selecting respiratory protection. In addition to regulatory requirements, evidence-based contaminant-specific best practices, or infection prevention and control guidance shall be considered during the respirator selection process.
2. When respirators to protect against bioaerosols are being selected, airborne transmissibility by potential emission sources and the infectivity of the bioaerosol shall be taken into consideration.
3. A control banding approach shall be used for selection of respiratory protection against bioaerosols that are capable of causing infection, adverse or allergic responses and have no established occupational exposure limits (OELs) or in the absence of regulations or other guidance. Control banding shall be used in conjunction with health and safety practices.

4. Control banding is a process in which risk factors are assessed using variables that are organized into ranges or bands; each variable is divided into four bands. The following three variables will be used to determine the appropriate level of respiratory protection:
 - (a) The risk group [nature of the hazard (bioaerosol type) and availability of treatment];
 - (b) The generation rate (from human release, activities or equipment); and
 - (c) The control level (e.g. ventilation).

The level of respiratory protection shall be determined as follows:

- Step 1: Identify the bioaerosol (known or suspected agent(s))
- Step 2: Confirm that a risk of transmission of disease, infection, or adverse health effects from inhalation of the bioaerosol containing the hazardous agent, under the specified conditions of the work activity/situation, requires a respirator.
- Step 3: Select applicable control banding wheel: General Workplace Environments or Health Care Facilities (see Figure 2 or 3)
- Step 4: Determine the bioaerosol risk group (R1, R2, R3, or R4)
- Step 5: Determine the generation rate (G1, G2, G3, or G4)
- Step 6: Determine the control level (C1, C2, C3 or C4)
- Step 7: Identify the number and colour of the segment selected at the intersection of the items identified in Steps 4 to 6. This corresponds to the range of options in the hierarchy of respiratory protection shown in Figure 4. The respirator shall be selected based on the level of protection identified in Figure 4.

Refer to Appendix B for case scenarios using selection wheels in Figure 2 and Figure 3.

Figure 1. Guide to Respirator Selection

SCBA – Self-Contained Breathing Apparatus
 PP – Positive Pressure
 IDLH – Immediately Dangerous to Life or Health
 PAPR – Powered Air-Purifying Respirator

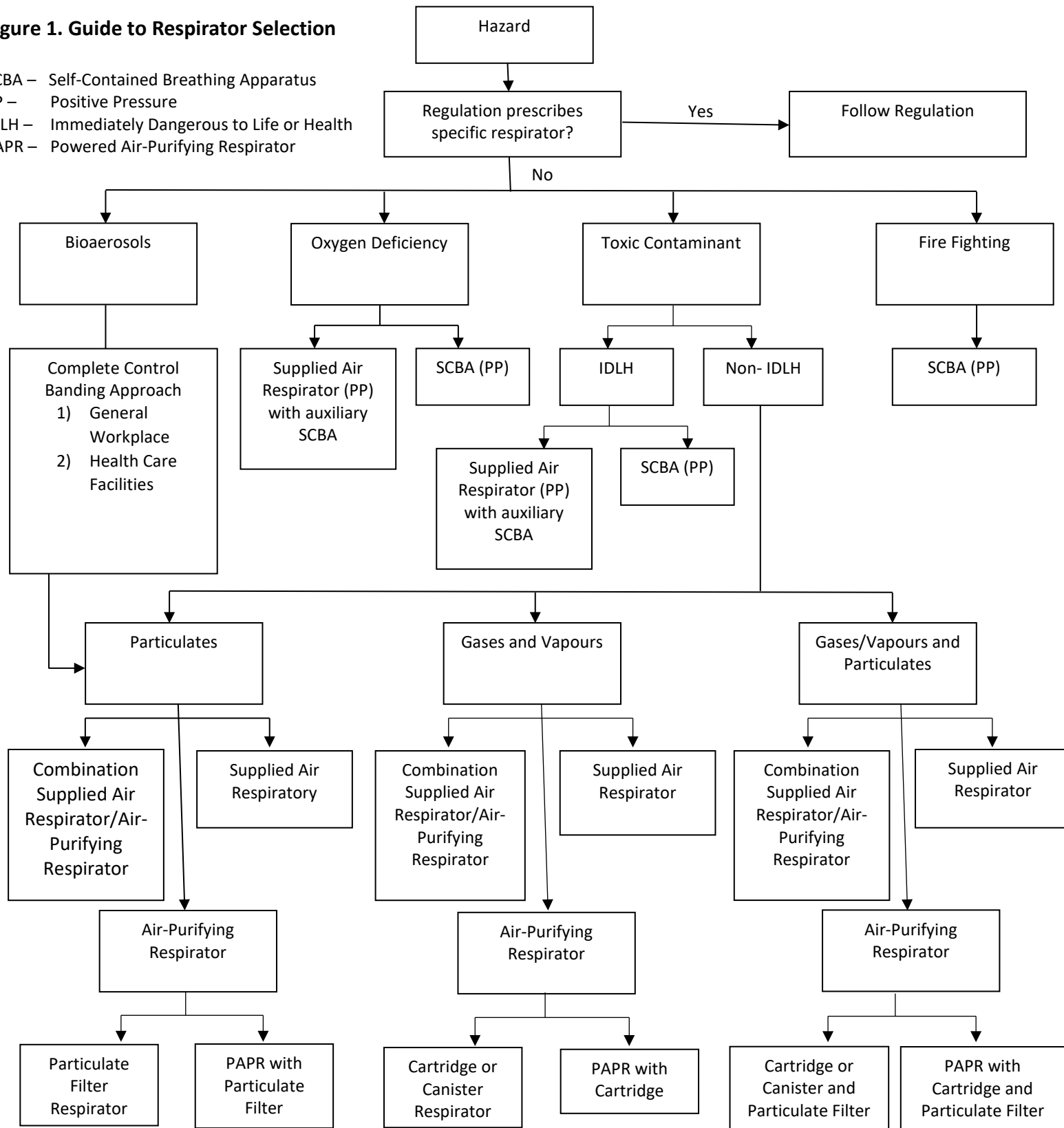


Figure 2: Control Banding Approach for Bioaerosols in General Workplace Environments

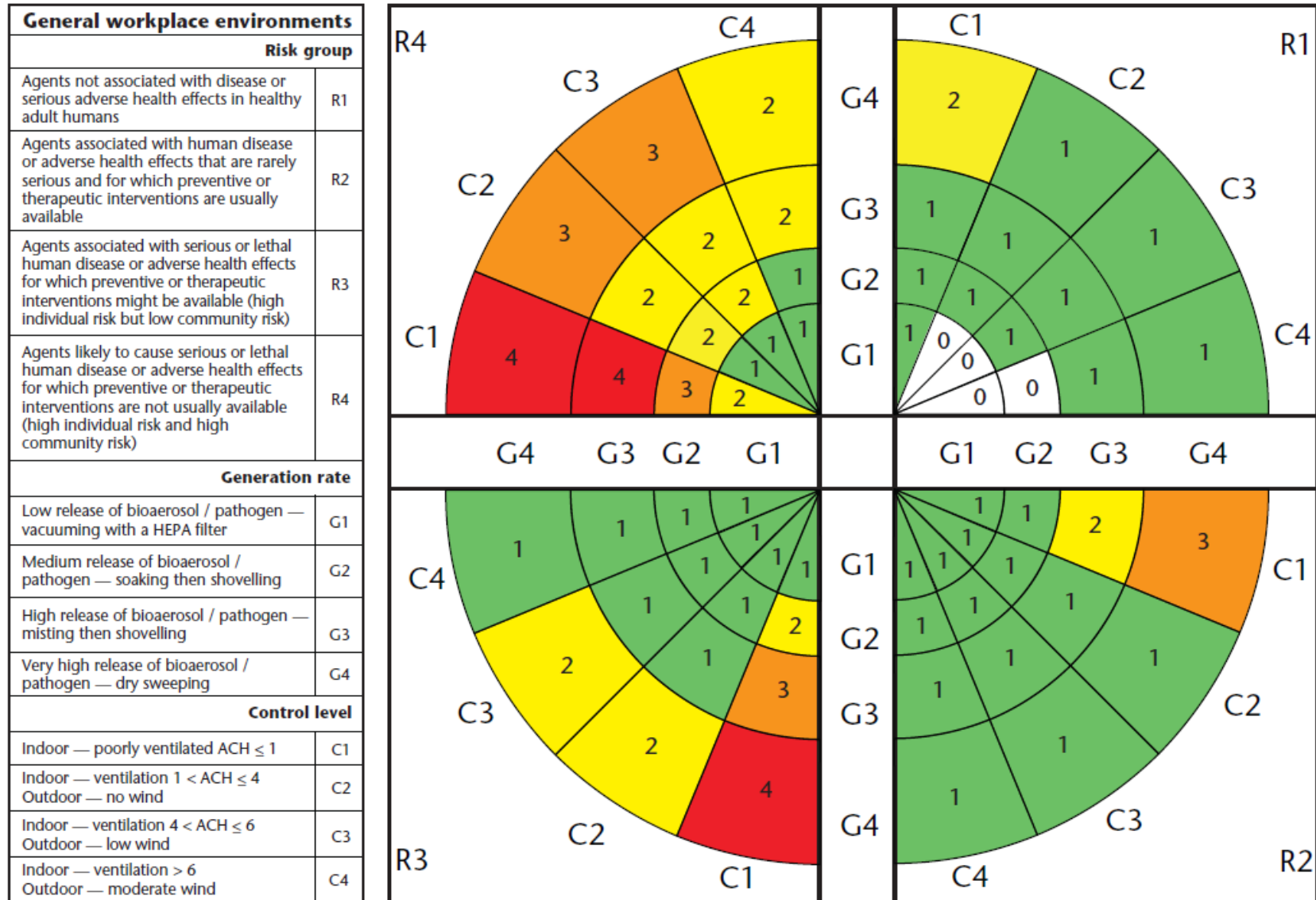
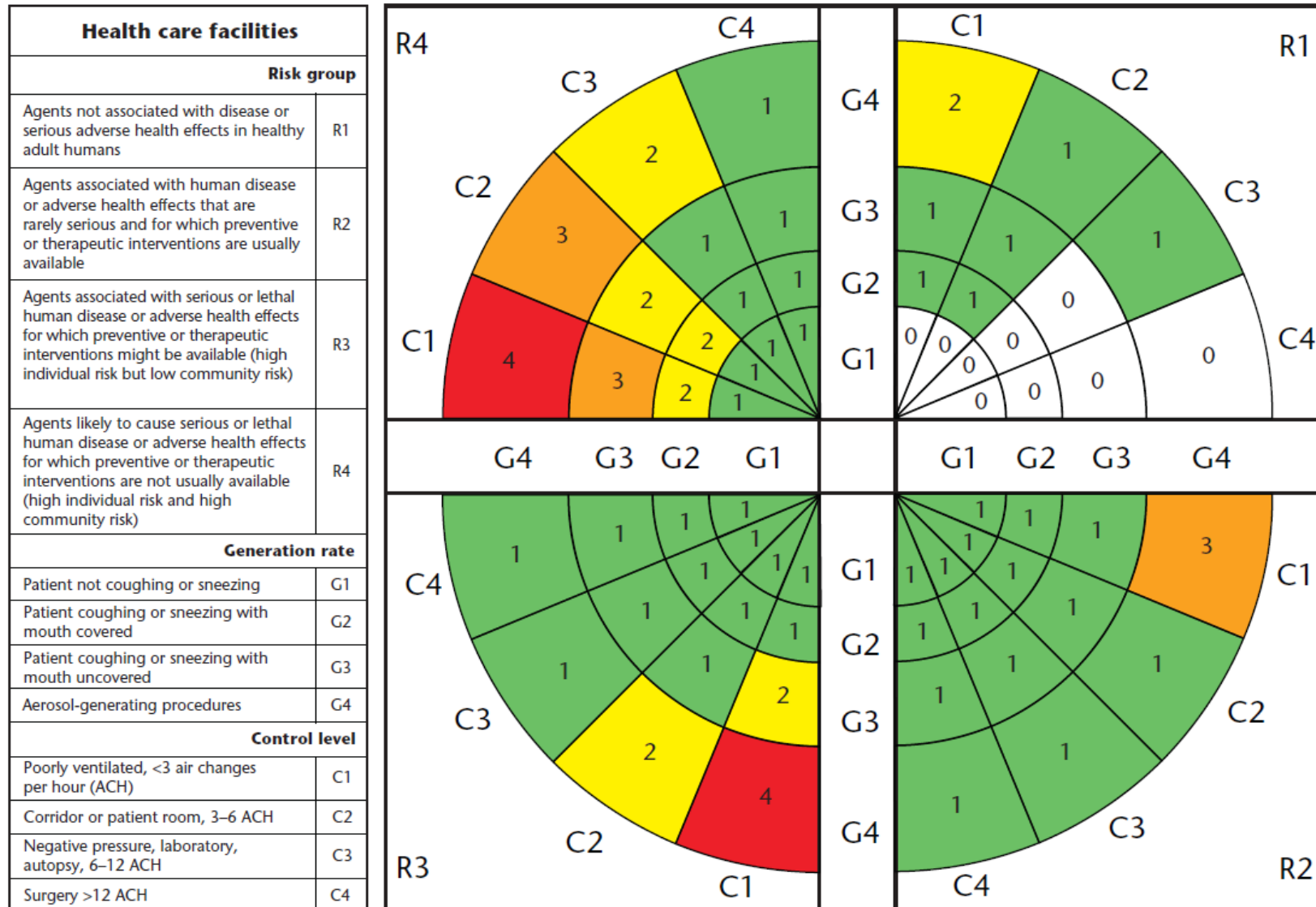


Figure 3: Control Banding Approach for Bioaerosols in Health Care Facilities



Acceptable level						Air-purifying options	APF	Atmosphere-supplying options
0	1	2	3	4	5			
					5	No air-purifying option available	10000	SCBA (pressure-demand) full-facepiece SCBA (pressure-demand) tight-fitting hood Multi-functional SCBA/airline
				4 to 5		Powered air-purifying full-facepiece Powered air-purifying helmet/hood with SWPF study	1000	Airline (continuous-flow) full-facepiece Airline (pressure-demand) full-facepiece Airline (continuous-flow) helmet/hood with SWPF study
			3 to 5			Powered air-purifying half-facepiece Air-purifying (negative-pressure) full-facepiece	50	Airline (pressure-demand) half-facepiece Airline (continuous-flow) half-facepiece
		2 to 5				Powered air-purifying loose-fitting facepiece/visor Powered air-purifying helmet/hood without SWPF study	25	Airline (continuous-flow) loose-fitting facepiece/visor Airline (continuous-flow) helmet/hood without SWPF study
	1 to 5					Air-purifying (negative-pressure) half-facepiece (including filtering facepieces)	10	No atmosphere-supplying option available
						No respiratory protection required	<1	No respiratory protection required

Notes:

(1) See Tables 1 and 2 for fit test pass/fail criteria for tight-fitting respirators.

(2) Fit testing is not required for loose-fitting respirators.

6.0 TRAINING

1. All workers whose work requires the use of a respirator shall receive appropriate training and education.
2. The workers shall receive training prior to the initial use of the respirator.
3. Training shall be provided by EHS for all U of T faculty, staff, students and visitors. For external contractors, see section 14.
4. The training shall include the following:
 - Why respiratory protection is necessary;
 - The limitations and capabilities of respiratory protection devices;
 - Respiratory hazard assessment;
 - Respirator selection process;
 - Respirator care and practical use (e.g. inspect, put on and remove a respirator, and how to perform user seals checks, etc.);
 - Procedures for repair, maintenance and storage of respiratory equipment;
 - How to recognize medical signs and symptoms that may limit or prevent the effective use of the respirator; and
 - General requirements of the Respiratory Protection Program including policies, procedures, roles, and responsibilities.
5. Refresher training must be completed every two years for all respirator users.
6. Records of the training shall be updated and maintained by the Supervisor/PI and EHS.
7. Training in the use of self-contained breathing apparatus (SCBA), if required, shall be provided by a qualified external trainer.
8. Additional training for the respirator user will be provided where:
 - i. A review cannot confirm that the individual remains qualified;
 - ii. EHS indicates that additional training is required; or
 - iii. A review indicates that additional training is needed to meet the required level of competency.


If additional training is required, EHS shall determine the training requirements and frequency.

7.0 RESPIRATOR FIT TESTING

The purpose of a qualitative or quantitative fit test is to verify a user's ability to obtain an effective seal and an acceptably comfortable fit for a selected tight-fitting respirator. The fit test process also verifies that a user is able to demonstrate the required level of competency in donning and doffing the respirator, as well as inspecting it and performing a user seal check.

1. Respirator users must pass an appropriate quantitative or qualitative fit test when using a respirator with a tight-fitting face piece.
2. Fit testing shall be conducted by EHS or a qualified provider which follows CSA Z94.4-18 (please consult with EHS beforehand).
3. The fit tester shall be competent in the applicable fit test methods and be able to verify a user's ability to obtain an effective respirator seal, comfort, and fit for a tight-fitting respirator.
4. The respirator user must demonstrate the required level of competency in donning and doffing the respirator, as well as inspecting and performing a user seal check without assistance.
5. A fit test shall be carried out
 - a) prior to initial use of a tight-fitting respirator
 - b) after completion of the EHS Respiratory Protection training
 - c) after completion of the Respirator User Screening Form (Appendix E)
 - d) at least every 2 years
 - e) when there is a change in respirator (e.g. make, model, or size)
 - f) when a respirator user experiences continued significant discomfort during use or difficulty in completing a successful user seal check
 - g) when there is a change in PPE use that could affect the respirator
 - h) when changes to the user's physical condition could affect the respirator fit such as (but not limited to):
 - facial scarring
 - dental changes
 - cosmetic surgery
 - significant weight change
 - facial rash (dermatological condition)
6. The respirator user shall be fit tested with the same make, model, style and size of respirator to be used.

7. Assessment of comfort and appropriateness of fit shall be completed prior to the fit test. The respirator user will be asked to complete a comfort assessment scoring according to the following criteria:
 - 0 – No issues.
 - 1 – Discomfort that can be ignored.
 - 2 – Some discomfort but still able to function.
 - 3 – Unacceptable discomfort – not bearable.
 - a) A score of 2 will prompt the fit tester to initiate a new re-donning or re-positioning or to use an alternative respirator option.
 - b) A score of 3 shall result in rejection of the respirator worn.
 - c) After passing the fit test, the respirator user shall be further assessed regarding the comfort of the respirator through the following question:
Does this specific respirator provide you an acceptable comfort level for the scope of your work? Yes or No.
8. The fit test shall only be performed on respirator users who are clean-shaven where the facepiece seals to the skin.
9. When a worker is required to wear other personal protective equipment, such as eye, face, head and hearing protection during his/her course of work, the same protective equipment shall be worn during the fit test to ensure they are compatible with the respirator and does not break the facial seal.
10. A respirator fit-test card will be issued to the respirator user upon successful completion of training and fit-test. The fit test card indicates the respirator manufacturer, model, size, and expiry date.

 UNIVERSITY OF TORONTO	Respirator Fit-Test Record
Full Name: _____ was successfully fit-tested and trained in the proper use, care, and limitations of this respirator.	
Make: _____ Model: _____ Size: _____	
Issue Date: _____ Expiry Date: _____	
Trainer Signature: _____ <small>Office of Environmental Health and Safety</small>	

11. The respirator user must only use the specific respirator (same manufacturer, model, and size) he/she was successfully fit tested with.
12. EHS shall maintain the fit test records.

8.0 RESPIRATOR INTERFERENCE CONCERNS

1. 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.
2. EHS 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.
3. Individuals shall present themselves for fit testing free from interference of hair where the respirator seals to the skin of the face or neck.
4. Individuals shall present themselves for fit testing in the same personal condition they would expect to be in when using the respirator. This includes hairstyles and wearing or not wearing dentures, eyeglasses or contact lenses.
5. Individuals shall present themselves for fit testing in such a way that personal accessories such as head covering, garments, facial jewellery, or other items shall not come between the skin and the sealing surface of the respirator.
6. 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.

9.0 USE OF RESPIRATORS

1. Prior to being assigned any task that requires the use of a respirator, the worker shall complete all the health screening, fit testing and training requirements.
2. Workers with facial hair that may interfere with the facepiece seal or valve function on tight-fitting respirators cannot use a tight-fitting respirator.
3. Other personal protective devices or equipment shall not interfere with the seal of the facepiece to the face of the worker.
4. Side arms on eyeglasses or any other material such as hair, cloth, tissue, straps and jewellery shall not come between the face and the sealing surface of the facepiece or interfere with the seal of the tight-fitting facepiece to the face or with the operation of the respirator. Workers who must have corrective eyewear, where the eyewear interferes with the

- respirator seal, shall be provided with the proper respirator spectacle kit by their department.
5. The worker shall check the seal of the facepiece immediately after donning the respirator each time.
 6. During the use of a tight-fitting respirator, the seal to the face or neck shall be effectively maintained 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.
 7. The worker should never break the respirator face-to-facepiece seal to communicate.
 8. Workers shall not remove their facepieces at any time while working in an IDLH atmosphere.
 9. Workers shall be permitted to leave the hazardous area for any respirator-related reason. The worker shall leave the hazardous area when:
 - The respirator fails to provide adequate protection;
 - The respirator malfunctions;
 - He/she detects air leakage around the face seal;
 - He/she detects an odour or tastes a chemical;
 - He/she has increased breathing resistance;
 - He/she experiences any illnesses or discomforts such as dizziness, nausea, weakness, breathing difficulties, sneezing, fever, chills, confusion, etc.;
 - He/she experiences extreme discomfort from wearing the respirator;
 - He/she needs to wash his/her face and facepiece to minimize skin irritation;
 - Components (including air tanks) or purifying devices need change-out.
 10. The respirator shall not be altered in any manner.
 11. All cartridges, replacement parts, etc., shall be from the same manufacturer as the respirator (e.g., use only NORTH cartridges and parts for a NORTH respirator).
 12. A change-out schedule shall be established for the replacement of air-purifying filters or cartridges of respirators before their useful service life is ended. Change-out can include end-of-service life indicators, maximum use time, manufacturer information, and breathing resistance as appropriate.

13. Warning properties (odour, irritation) of the contaminant shall not be relied on for cartridge/canister change-out. If workers detect odour or experience any irritation symptoms of the contaminant before the end of the change-out schedule, EHS shall be informed to re-evaluate the respirator use (i.e. change-out schedule, workplace concentrations or other conditions of use).
14. Where respirators are used for HAZMAT response, confined space entry, etc., the applicable legislation, regulations, standards and guidelines shall be consulted.
15. 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.

10.0 CLEANING, INSPECTION, MAINTENANCE, AND STORAGE OF RESPIRATORS

1. The University shall provide each worker requiring a respirator with a respirator that is clean, sanitary and in good working order.
2. Each worker issued a respirator shall properly maintain his/her respirator to retain its original effectiveness. Respirator care and maintenance shall include:
 - Cleaning and sanitizing
 - Inspection, testing, and repair;
 - Proper storage; and
 - Recordkeeping
3. Defective or non-functioning respirators shall be identified as out of service (e.g. by being tagged) and shall be replaced or removed from service until repaired.
4. The respirator shall be cleaned and sanitized according to the respirator manufacturer's instructions and/or according to procedures found in Appendix D – Procedures for Respirator Maintenance.
5. Respirators designed not to be cleaned (e.g. N95) shall be disposed of after use.
6. The frequency of cleaning shall depend on how many workers use the respirator and what it is used for.
 - Respirators issued to individual workers shall be cleaned and disinfected as often as necessary to maintain proper hygiene.

- A single respirator issued to multiple workers must be cleaned and disinfected before each use.
 - Respirators designated for emergency use only must be cleaned and disinfected after each use.
7. The worker shall inspect his/her respirator before and after each use. The procedure for respirator inspection is found in Appendix D – Procedures for Respirator Maintenance.
 8. The worker shall report defective or non-functioning respirators to his/her supervisor. These respirators shall be tagged and removed from service by the supervisor until repaired or replaced.
 9. Any respirator repairs shall be performed by the unit manufacturer or by a qualified external contractor. Defective or non-functioning half mask facepieces shall not be repaired but will be disposed and replaced instead.
 10. The worker shall store their respirators in a clean and sanitary location, in boxes or in plastic bags, marked with each worker's name. The respirators shall be stored in a manner that will protect them from dust, ozone, sunlight, heat, extreme cold, excessive moisture, vermin, damaging chemicals, oils, greases, or any other potential hazard that may have a detrimental effect on the respirator.
 11. Respirators shall be stored in a manner that will prevent deformation of the rubber or other elastomeric parts.
 12. Used cartridges/filters to be re-used shall be stored in a manner to prevent contamination of the respirator facepiece.

11.0 MEDICAL SURVEILLANCE

1. Prior to fit testing and respirator use, it shall be confirmed that the worker is free from any physiological or psychological condition that may prevent the person from using the selected respirator. This shall be achieved through the use of the Respirator User Screening Form (Appendix E).
2. The worker and supervisor shall complete their respective parts of the Respirator User Screening Form and submit the form to EHS at the time of fit testing.
3. Based on the Respirator User Screening Form, if the respirator user is concerned that a physiological or psychological condition exists that may preclude the use of a respirator, a medical evaluation conducted by Occupational Health must be conducted **prior** to booking a fit-test

- appointment or using a respirator. The user is responsible for bringing the completed Respirator User Screening Form to the medical evaluation and subsequent fit test.
4. The medical evaluation shall consist of a primary assessment conducted by the Occupational Health Nurse and if deemed necessary a further assessment conducted by the Occupational Health Physician.
 5. The worker, his or her supervisor, and EHS shall provide the Occupational Health Nurse and/or the Occupational Health Physician with information regarding the conditions of the respirator use and the type of respirator(s) required.
 6. After the medical evaluation, the Occupational Health Physician shall provide a written opinion (Part E of the Respirator User Screening Form) regarding the employee's ability to use a respirator. The opinion shall indicate one of the following:
 - a) User has a medical condition that makes fit-testing with the chosen method(s) inadvisable;
 - b) User meets medical requirements to use the selected respirator;
 - c) User meets medical requirements to use the selected respirator with limitations and how to accommodate to ensure adequate respiratory protection in the precise context of exposure; or
 - d) User does not meet medical requirements to use the selected respirator.
 7. The re-evaluation of the worker shall not be performed on an annual basis. The re-evaluation shall be performed based on one of the following criteria:
 - a) The worker reports signs or symptoms that are relevant to the worker's ability to use a respirator;
 - b) The Occupational Health Physician, supervisor or EHS considers it necessary for the worker to be re-evaluated;
 - c) A change in workplace conditions occurs that may result in substantial increase in the physiological burden that respirator use places on the worker.
 8. Workers who do not meet medical requirements to use a selected respirator shall not work in an area where the use of a respirator is required. Where applicable, worker and their supervisor shall also contact their local HR office and/or Health and Well-Being Program and Services for further assistance on medical accommodation.

12.0 PROGRAM EVALUATION

1. The Respiratory Protection Program shall be reviewed annually by EHS.

2. The review of the program shall include:
 - a) A review of program elements against regulatory requirements;
 - b) A review of definitions of roles and responsibilities;
 - c) A review of documented program procedures;
 - d) Examination of records to verify that documented procedures are being followed;
 - e) Confirmation that workplace practices comply with program requirements;
 - f) Documentation of performance problems and subsequent resolution or corrective action plans;
 - g) Stakeholder input to verify worker acceptance (e.g. regarding comfort, ease of breathing, fatigue, vision, mobility, job interference, utility);
 - h) Proper selection, use and maintenance of respirators;
 - i) Effective training of all stakeholders;
 - j) Proper inspection of respirators; and
 - k) Proper storage and maintenance of respirators.

3. EHS shall review the information derived from the medical and biological monitoring performed, where available.

13.0 RECORDKEEPING

1. Supervisors shall maintain records of the following:
 - a) Hazard assessment;
 - b) Training for workers under their supervision;
 - c) Respirator selection; and
 - d) Inspection, maintenance and storage.

2. EHS shall maintain the records of the following:
 - a) Fit testing;
 - b) Training;
 - c) Hazard assessment;
 - d) Respirator selection; and
 - e) Program evaluation.

3. The fit testing records shall consist of the following:
 - a) Name and identification of the worker tested;
 - b) Type of test performed;
 - c) Make, model and size of the respirator fitted;
 - d) Date of the fit test;
 - e) Result of the fit test; and
 - f) Name of the person conducting the fit test.

- a. Occupational Health shall maintain the medical records for the workers that have undergone medical evaluations. These records shall be treated as medically confidential.

14.0 EXTERNAL CONTRACTORS

1. All external contractors must be able to demonstrate compliance with the requirements outlined in this program.
2. Before authorizing work in an area where a respiratory hazard has been identified, the department retaining the contractor shall provide a report to the prospective contractor as part of the work specification. The report shall contain the hazard assessment of the area.
3. External contractors must provide written evidence that their workers have undergone a medical evaluation, received appropriate respiratory training, and that they have been fit tested for the appropriate approved respirators.

APPENDIX A: Classification and Description of Respirators by Mode of Operation

1) Air-Purifying Respirators

Air-purifying respirators can be used to protect against airborne contaminants such as dusts, mists, fumes, smokes, aerosols, gases and vapours. **Since these respirators are air-purifying only, this type of respiratory protection must NEVER be used in oxygen-deficient atmospheres or situations that are immediately dangerous to life or health (IDLH).**

The general categories of air-purifying respirators are:

- a) Particulate (dust, fume and mist)**
- b) Gas and Vapour**
- c) Combination of Particulate and Gas/Vapour**

The air-purifying respirators are available in two modes of operation: 1) Non-powered (APR) and 2) Powered (PAPR). The non-powered respirators come in two designs: 1) half mask and 2) full facepiece. (Quarter mask and mouthpiece respirators are also available but are not recommended). The powered air-purifying respirators contain a battery powered blower unit equipped with a facepiece, helmet or hood.

2) Atmosphere-Supplying Respirators

a) Supplied Air Respirators

The supplied air respirator consists of a half-mask, full facepiece, hood or helmet to which respirable air is supplied through a small diameter hose. Two types of flow may be used: 1) continuous-flow to the mask in which the flow maintains the mask under positive pressure at moderate work rates; and 2) pressure-demand, which keeps the mask under positive pressure at moderately high work rates but limits the air quantity used to that required for breathing. Demand airflow, which allows the pressure inside the mask to become negative during inhalation, is not recommended because it does not provide as much protection. The respirable supplied-air comes from A) a compressor or B) compressed air cylinder(s).

Supplied air respirators may be used in IDLH or oxygen-deficient atmospheres only if an auxiliary tank of air is incorporated into the respirator system.

b) Self-Contained Breathing Apparatus (SCBA)

SCBAs comprise of a full facepiece connected to a source of air carried by the wearer. The SCBAs provide respiratory protection in oxygen-deficient environments

and in situations where high or unknown concentrations of toxic gases, vapours or particulates are present. The SCBA can also provide protection in emergency situations. When using an SCBA, the user's respiratory system is isolated from the surrounding atmosphere because no outside air is admitted into the respirator facepiece. There are three types: 1) open-circuit devices; 2) closed-circuit (re-breathing) devices; and 3) escape units. Two types of flow are available: 1) pressure demand and 2) demand. The demand SCBAs must not be used in oxygen-deficient atmospheres or IDLH atmospheres because they allow the pressure inside the facepiece to become negative.

3) Combination Atmosphere-Supplying and Air-Purifying Respirators

These devices usually consist of an atmosphere-supplying respirator with an auxiliary air-purifying attachment that provides protection in the event that the air supply fails. A combination atmosphere-supplying respirator with an auxiliary air-purifying element may be used only when the concentration of airborne contaminants in the workplace does not exceed the maximum use concentration of the respirator when used in the air-purifying mode.

APPENDIX B: Selection of Respirators for Protection against Bioaerosols

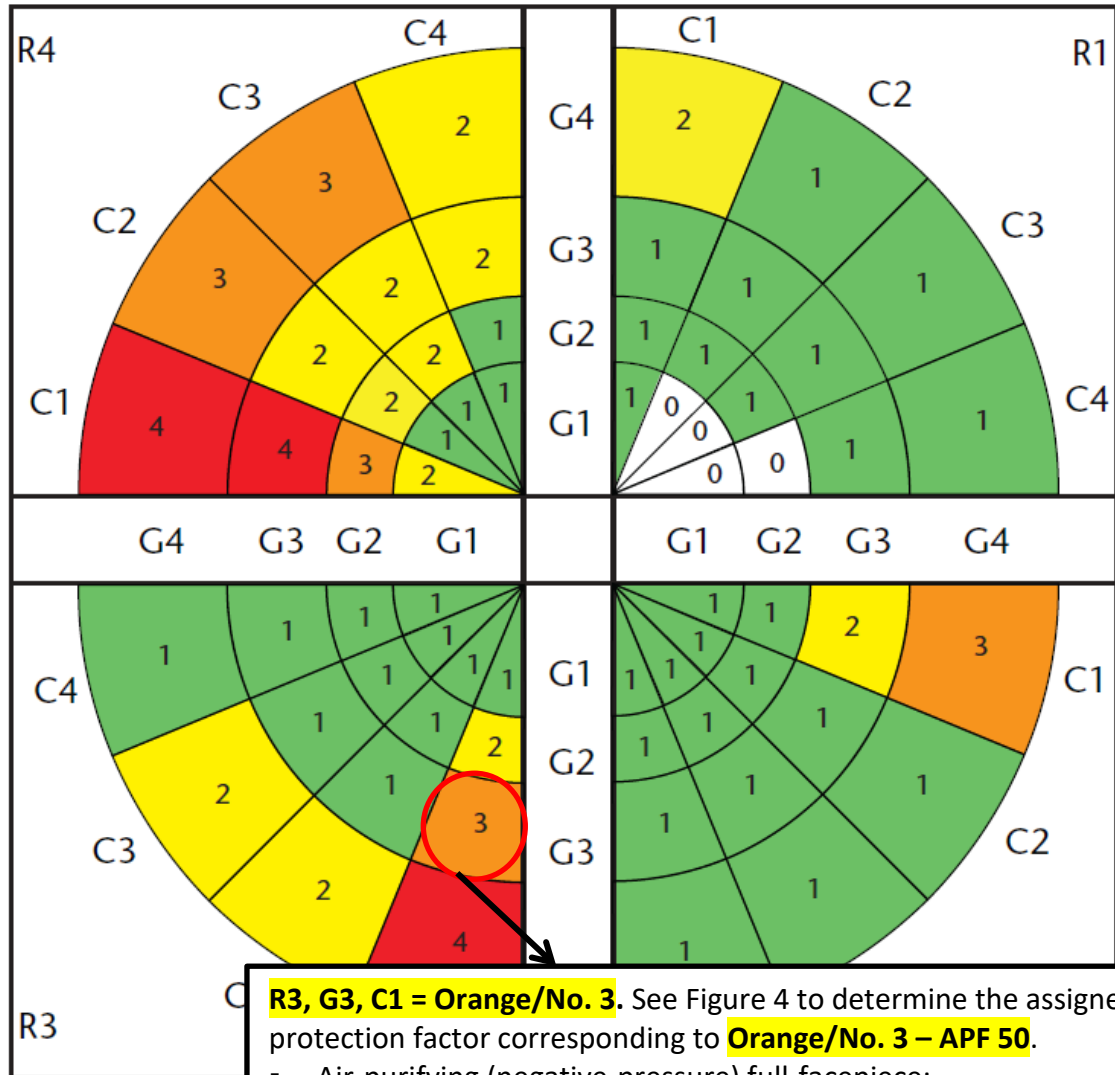
Scenarios using the selection wheels in Figure 2 and 3

Scenario 1: Histoplasmosis (from CSA Z94.4-18 Selection, use and care of respirators)

A worker is directed to go into a warehouse that has been occupied by pigeons for many years. Piles of pigeon excrement about a metre deep are found under roosting locations. The clean-up will be done indoors with no additional ventilation.

Step 1	Identify the bioaerosol. Histoplasma capsulatum
Step 2	Transmission of disease, infection, or adverse effects produced from inhalation of bioaerosol. Yes (histoplasmosis)
Step 3	Select applicable, control banding wheel: health care facility or general workplace environment (see Figure 2 or 3) General workplace environment – Figure 2
Step 4	Determine the bioaerosol risk group (R1, R2, R3 or R4) R3: Agents associated with serious or lethal human disease or adverse health effects for which preventive or therapeutic interventions might be available (high individual risk but low community risk)
Step 5	Determine the generation rate (G1, G2, G3, or G4) G3 – Misting then shovelling
Step 6	Determine the control level (C1, C2, C3 or C4) C1 – Indoor – Poorly ventilated ACH ≤ 1
Step 7	Identify the number and colour of the segment selected at the intersection of the variables identified in Steps 4 to 6: R3, G3, C1 = Orange/No. 3 See Figure 4 to determine the assigned protection factor corresponding to Orange/No. 3 – APF 50. <ul style="list-style-type: none">▪ Air-purifying (negative-pressure) full-facepiece;▪ Powered air-purifying half-facepiece▪ Airline (pressure-demand) half-facepiece; or▪ Airline (continuous-flow) half-facepiece

General workplace environments	
Risk group	
Agents not associated with disease or serious adverse health effects in healthy adult humans	R1
Agents associated with human disease or adverse health effects that are rarely serious and for which preventive or therapeutic interventions are usually available	R2
Agents associated with serious or lethal human disease or adverse health effects for which preventive or therapeutic interventions might be available (high individual risk but low community risk)	R3
Agents likely to cause serious or lethal human disease or adverse health effects for which preventive or therapeutic interventions are not usually available (high individual risk and high community risk)	R4
Generation rate	
Low release of bioaerosol / pathogen — vacuuming with a HEPA filter	G1
Medium release of bioaerosol / pathogen — soaking then shovelling	G2
High release of bioaerosol / pathogen — misting then shovelling	G3
Very high release of bioaerosol / pathogen — dry sweeping	G4
Control level	
Indoor — poorly ventilated $ACH \leq 1$	C1
Indoor — ventilation $1 < ACH \leq 4$ Outdoor — no wind	C2
Indoor — ventilation $4 < ACH \leq 6$ Outdoor — low wind	C3
Indoor — ventilation > 6 Outdoor — moderate wind	C4

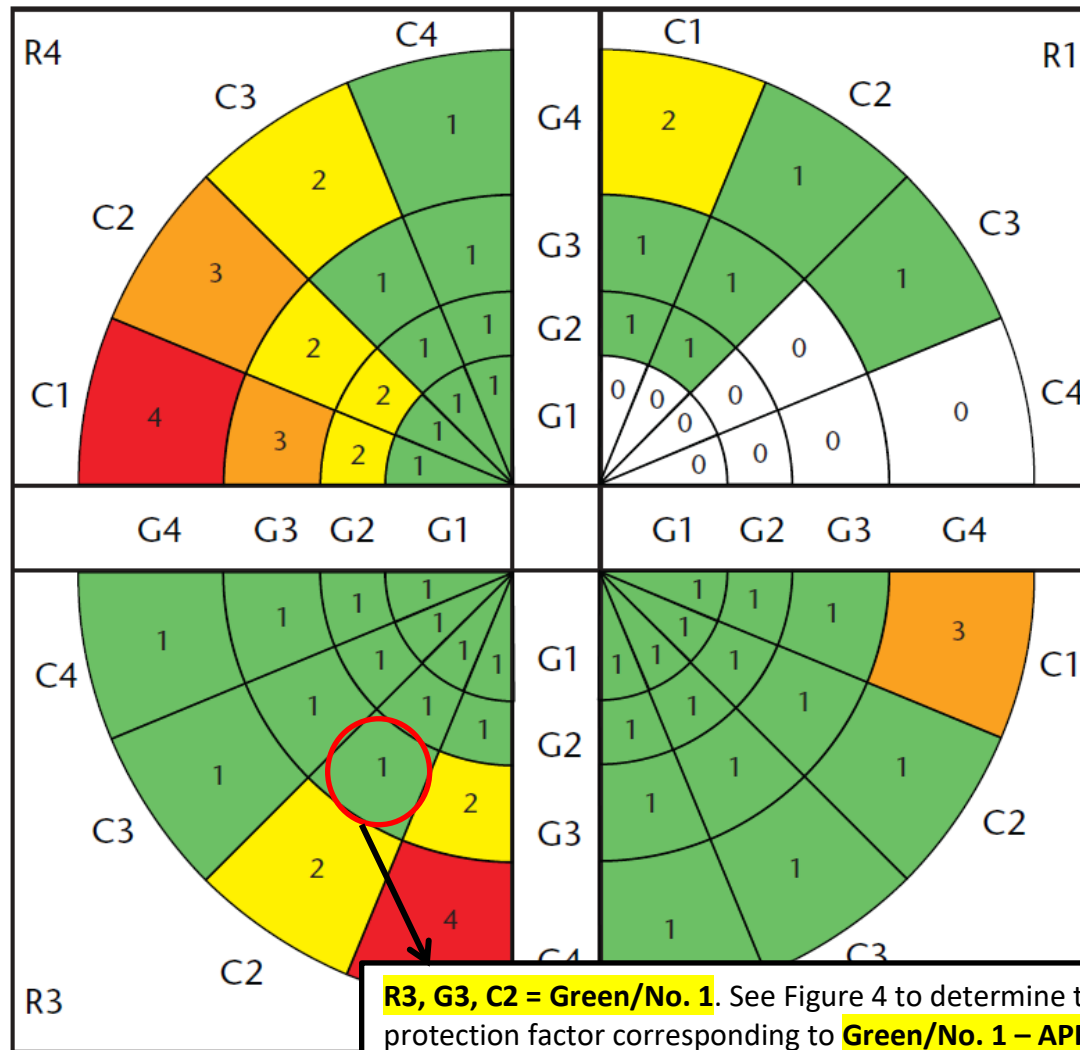


Scenario 2: Tuberculosis exposure

A dental hygienist is working in the clinic on a patient who has been diagnosed with pulmonary mycobacterium tuberculosis and has a cough.

Step 1	Identify the bioaerosol. Mycobacterium tuberculosis
Step 2	Transmission of disease, infection, or adverse effects produced from inhalation of bioaerosol. Yes, pulmonary mycobacterium tuberculosis
Step 3	Select applicable, control banding wheel: health care facility or general workplace environment (see Figure 2 or 3) Health care facility – Figure 3
Step 4	Determine the bioaerosol risk group (R1, R2, R3 or R4) R3: Agents associated with serious or lethal human disease or adverse health effects for which preventive or therapeutic interventions might be available (high individual risk but low community risk)
Step 5	Determine the generation rate (G1, G2, G3, or G4) G3 – Patient coughing or sneezing with mouth uncovered
Step 6	Determine the control level (C1, C2, C3 or C4) C2 – Corridor or patient room, 3-6 ACH
Step 7	Identify the number and colour of the segment selected at the intersection of the variables identified in Steps 4 to 6: R3, G3, C2 = Green/No. 1. See Figure 4 to determine the assigned protection factor corresponding to Green/No. 1 – APF 10. <ul style="list-style-type: none">▪ Air-purifying (negative-pressure) full-facepiece (including filtering facepieces (e.g. N95))▪ No atmosphere-supplying option available

Health care facilities	
Risk group	
Agents not associated with disease or serious adverse health effects in healthy adult humans	R1
Agents associated with human disease or adverse health effects that are rarely serious and for which preventive or therapeutic interventions are usually available	R2
Agents associated with serious or lethal human disease or adverse health effects for which preventive or therapeutic interventions might be available (high individual risk but low community risk)	R3
Agents likely to cause serious or lethal human disease or adverse health effects for which preventive or therapeutic interventions are not usually available (high individual risk and high community risk)	R4
Generation rate	
Patient not coughing or sneezing	G1
Patient coughing or sneezing with mouth covered	G2
Patient coughing or sneezing with mouth uncovered	G3
Aerosol-generating procedures	G4
Control level	
Poorly ventilated, <3 air changes per hour (ACH)	C1
Corridor or patient room, 3–6 ACH	C2
Negative pressure, laboratory, autopsy, 6–12 ACH	C3
Surgery >12 ACH	C4



R3, G3, C2 = Green/No. 1. See Figure 4 to determine the assigned protection factor corresponding to **Green/No. 1 – APF 10.**

- Air-purifying (negative-pressure) full-facepiece (including filtering facepieces (e.g. N95))
- No atmosphere-supplying option available

APPENDIX C: Assigned Protection Factors (APF)

Respirator Type		CSA Z94.4-18	OSHA	NIOSH
Air Purifying	Half-facepiece	10	10	10
	Full-facepiece	50 (QLFT 10)	50	10 ¹ /50 ²
Powered Air Purifying	Loose-fitting facepiece	25	25	25
	Half-facepiece	50	50	50
	Full-facepiece	1000	1000	50
	Helmet or hood	25/1000 ³	25/1000 ³	25
Air Line Continuous Flow Supplied Air	Loose-fitting facepiece	25	25	25
	Half-facepiece	50	50	50
	Full-facepiece	1000	1000	50
	Helmet or hood	25/1000 ³	25/1000 ³	25
Air line Pressure Demand	Half-facepiece	50	50	1000
	Full-facepiece	1000	1000	2000
	SCBA full-facepiece	10000 ⁴	10000	10000
	SCBA tight-fitting hood	10000 ⁴	10000	----- -

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

¹ APF of 10 with full facepiece respirators equipped with N/R/P 95 or 99 class filters.

² APF of 50 with a full facepiece equipped with a class 100 filter. Full facepiece with gas/vapour cartridge and/or equipped with a 100 class pre-filter

³ Manufacturer must demonstrate APF of 1000

⁴ Must be QNTF – Quantitative fit-test

APPENDIX D: Procedures for Respirator Maintenance

The principal aspects of respirator care include: cleaning/disinfecting, inspection, storage and repair.

A. Cleaning and Disinfecting

- 1) Remove filters, cartridges, or canisters. Disassemble facepiece. Discard or repair any defective parts.
- 2) Wash components in warm (43°C maximum) water with mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle brush may be used to remove any dirt.
- 3) Rinse components thoroughly in clean, warm, preferably running water. Drain.
- 4) When the cleaner used to clean the respirator does not contain a disinfecting agent, respirator components should be fully immersed for 2 minutes in one of the following:
 - a) sodium hypochlorite solution – 1mL of bleach to 1L of water
 - b) aqueous solution of iodine – 0.8mL of tincture of iodine to 1L of water
 - c) other commercially available cleaners of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
- 5) Rinse components thoroughly in clean, warm, preferably running water. Drain.
- 6) Components should be allowed to air dry or be hand dried with a clean, lint free cloth.
- 7) Re-assemble the facepiece, replacing filters, cartridges, and canisters where necessary.

Disinfection (steps 4 & 5) is not required for a respirator used by only one worker. For multiple users, however, the respirator must be cleaned and sanitized before it is transferred to another person for use.

The disinfecting solution must not damage the respirator and must not cause skin irritation to the respirator wearer. Proper rinsing of the respirator is important to ensure that this does not happen.

Alcohol wipes should not be used on rubber components of the respirator to prevent drying out and potential damage to the rubber.

B. Inspecting

- a) Check the condition of component parts:
 - Check condition of the facepiece, looking for cracks, cuts, tears, holes and distortion of facepiece;
 - Check head straps to ensure they are properly attached and have elasticity;
 - Check head straps for broken buckles, breaks and tears;
 - Check inhalation and exhalation valves to ensure that they are in place and are not damaged;
 - Check all rubber or flexible parts for cracks and pliability;
 - Check cartridges, canisters, and filters to ensure that they are not spent;
 - Check for cracks or damage to cartridge, filter, or canister;
 - Check the breathing tube (if present) for cracks, holes, missing or loose clamps, and broken or missing end connectors;
 - Check the hood, helmet, or suit (if present) for ripped or torn seams, and for cracks or breaks in the face shield; and
 - Check the PAPR assembly (PAPR users only)
- b) Check the tightness of connections between cartridges, filters and the respirator facepiece.
- c) Check the end-of-service-life indicator (if present).
- d) Check the expiration date on the side of the cartridge, filter, or canister (if present).

APPENDIX E: Respirator User Screening Form



ENVIRONMENTAL HEALTH & SAFETY

RESPIRATOR USER SCREENING FORM

Parts 1, 2 and 3 of this form should be completed by the supervisor of the respirator user

PART 1: RESPIRATOR USER INFORMATION

First Name: _____ Last Name: _____
Personnel Number: _____ Telephone: _____
Department: _____ Job Title: _____
Supervisor Name: _____

PART 2: CONDITIONS OF USE AND SPECIAL WORK CONSIDERATIONS

Activities requiring respirator use:
Frequency of respirator use: daily weekly monthly yearly uncertain
Exertion level during use: light moderate heavy other
Duration of respirator use per shift: < ¼ hour > ¼ hour > 2 hours variable
Temperature during use: < 0°C > 0°C and < 25°C > 25°C
Conditions pertaining to heat or cold stress:
 Not applicable
 Continuous work > 30 minutes when Humidex > 30°C (indoors or outdoors)
 Continuous work > 30 minutes in hot indoor areas (e.g., steam plant, mechanical rooms)
 Continuous work > 30 minutes in temperatures < -15°C or wind chill < -25°C
Atmospheric pressure during use: reduced normal/ambient increased
Uncontrolled hostile environment: not applicable emergency escape police activity IDLH
 oxygen deficiency confined spaces hazardous materials (emergency)
 other (please specify): _____
Other personal protective equipment (PPE):
 Not applicable
 Additional types of PPE equipment will be worn during respiratory use:
Please specify: _____
 Tools/equipment will be carried during respirator use:
Maximum weight of tools/equipment: _____
Average weight of tools/equipment: _____

PART 3: TYPES OF RESPIRATORS TO BE USED (check all that apply)

- air-purifying respirator (APR):
 - disposable APR (e.g., N95)
 - non-powered half-face elastomeric respirator
 - non-powered full-face elastomeric respirator
 - powered air-purifying respirator (PAPR)
- supplied-air respirator (SAR)
- self-contained breathing apparatus (SCBA)
- other (please specify): _____

Please note: EHS conducts fit-testing with a limited number of respirator options. If a Department uses a specific make and model of respirator, the user is responsible for bringing a respirator to the fit-testing session. Please contact EHS if you have any questions.

Supervisor Signature: _____ Date: _____
Once signed, all fields on page 1 will be locked.

Form updated 2021-07-12

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PART 4: RESPIRATOR USER'S HEALTH CONDITIONS (to be completed by respirator user)

(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 any other condition that could affect respirator use? Select YES or NO. **DO NOT specify the condition(s).**

YES NO

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

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

(c) Do you have concerns about your future ability to use a respirator safely? Yes No

Please note: if you answered YES to (a), (b) or (c), further assessment by Occupational Health is required prior to respirator use.

Signature of Respirator User: _____

Date: _____

Once signed, all fields in part 4 be locked.

PART 5: HEALTH CARE PROFESSIONAL PRIMARY ASSESSMENT (if required) – to be completed by Occupational Health Nurse

Assessment date: _____

Respirator use permitted: Yes No Uncertain

Referred to medical assessment: Yes No

Comments: _____

Reassessment date: _____

Name of Health Care Professional: _____

Title: _____

Signature of Health Care Professional: _____

Date: _____

Once signed, all fields in part 5 will be locked.

PART 6: MEDICAL ASSESSMENT (if required) – to be completed by Occupational Health Physician

Assessment date: _____

- Class 1: Respirator use is permitted with no restrictions
- Class 2: Respirator use is permitted with specific restrictions:
Specify: _____
- Class 3: Respirator use is not permitted

Name of Physician: _____

Signature of Physician: _____

Date: _____

Once signed, all fields in part 6 will be locked.