



Respirator Standard: Selection and Use

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 oxygen- deficiency or airborne contaminants (dusts, fumes, mists, gases, vapours, aerosols). This standard is based on the Canadian Standards Association (CSA) Standard Z94.4-02 (*Selection, Use and Care of Respirators*).

Scope:

Any worker who may be exposed to respiratory hazards during the course of work at the University.

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

Responsibilities:

Principal investigators/supervisors and all others in authority shall:

- Identify situations where respirators are required;
- Conduct, in consultation with the Office of Environmental Health and Safety, assessments for respiratory hazards;
- Determine (using this standard or in conjunction with the Office of Environmental Health and Safety) the type of respiratory protection required for the specific respiratory hazard(s);
- Provide workers with appropriate respiratory protection;
- Ensure that health screening, training and fit testing of workers are completed prior to assigning workers a task that requires a respirator;
- Ensure that workers use the respirators in accordance with the instructions and the training received;
- Ensure that the workers use only those respirators for which they have been qualified;
- Ensure respirators are cleaned, sanitized, inspected, maintained, repaired, and stored in accordance with training and manufacturer's recommendations;
- In case of a tight-fitting facepiece, ensure that 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 the Office of Environmental Health and Safety of respirator users' concerns, changes in processes, equipment, or operating procedures that have impact on environmental conditions, and respiratory protection requirements;
- Notify the Office of Environmental Health and Safety of the incidents where the use of a respirator may have prevented or contributed to an accident or injury.



- 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; and
- Ensure that workers wear appropriate respiratory protection at all times in respiratory hazard areas.

Workers (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 prior to each use in accordance with the training received;
- Clean, maintain and store the respirators in accordance with the training received and the manufacturer's instructions;
- Perform negative and positive pressure check after each donning of a tight-fitting respirator;
- Report any damage or malfunction of the respirator to their supervisor;
- Report to their supervisor or other person in authority any condition or change that may impact on 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 written instructions and training received.

Respiratory Protection Devices:

In situations where the respiratory tract could be exposed to potentially hazardous materials or environments, appropriate respiratory protection must be worn. Appropriate respiratory protection must protect against the specific hazard(s) present, provide a comfortable and secure fit, and comply with CSA Standard Z94.4-02, "Selection, Use and Care of Respirators."

It is imperative that workers receive proper training prior to the initial use of respiratory protection devices (contact the Office of Environmental Health and Safety for further details).

Appendix A outlines the recommended respiratory protection to be worn when exposed to different types of respiratory hazards.

The following sections outline the general categories of respiratory protection devices:

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 which are immediately dangerous to life and health (IDLH).



The general categories of air-purifying respirators are:

- Particulate (Dust, fume and mist)
- Gas and vapour
- Combination

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

Selection of the most appropriate air-purifying respirator and cartridges/filters depends on factors such as the frequency of use, the type of contaminants and the anticipated concentration of those contaminants. Other considerations regarding the appropriate selection and use of air-purifying respirators are adequate warning properties of gases or vapours, whether the area is a confined space (as defined in the University's Confined Space Program), humidity levels and the potential presence of unknown contaminants.

Any worker who is required to use a respirator must be trained with respect to the limitations of that respirator, as well as: proper fit, inspection, maintenance, cleaning and storage. The University's Respiratory Protection Program covers these requirements (contact the Office of Environmental Health and Safety for further details).

2) Atmosphere Supplying Respirators

a) Air-Line Respirators

The air-line respirator consists of a half mask, full face piece, 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 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 1) compressor or 2) compressed air cylinder(s).

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



Training in proper use and maintenance is very important. The University's Respiratory Protection Program covers these requirements (contact the Office of Environmental Health and Safety for further details).

b) Self-Contained Breathing Apparatus (SCBA)

SCBAs use a full face piece connected to a source of air carried by the wearer. The SCBA provides 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 the SCBA, the user's respiratory system is isolated from the surrounding atmosphere because no outside air is admitted into the mask.

There are three types of SCBAs:

- 1) open-circuit devices;
- 2) closed-circuit (re-breathing) devices; and
- 3) escape units.

Two types of flow are available:

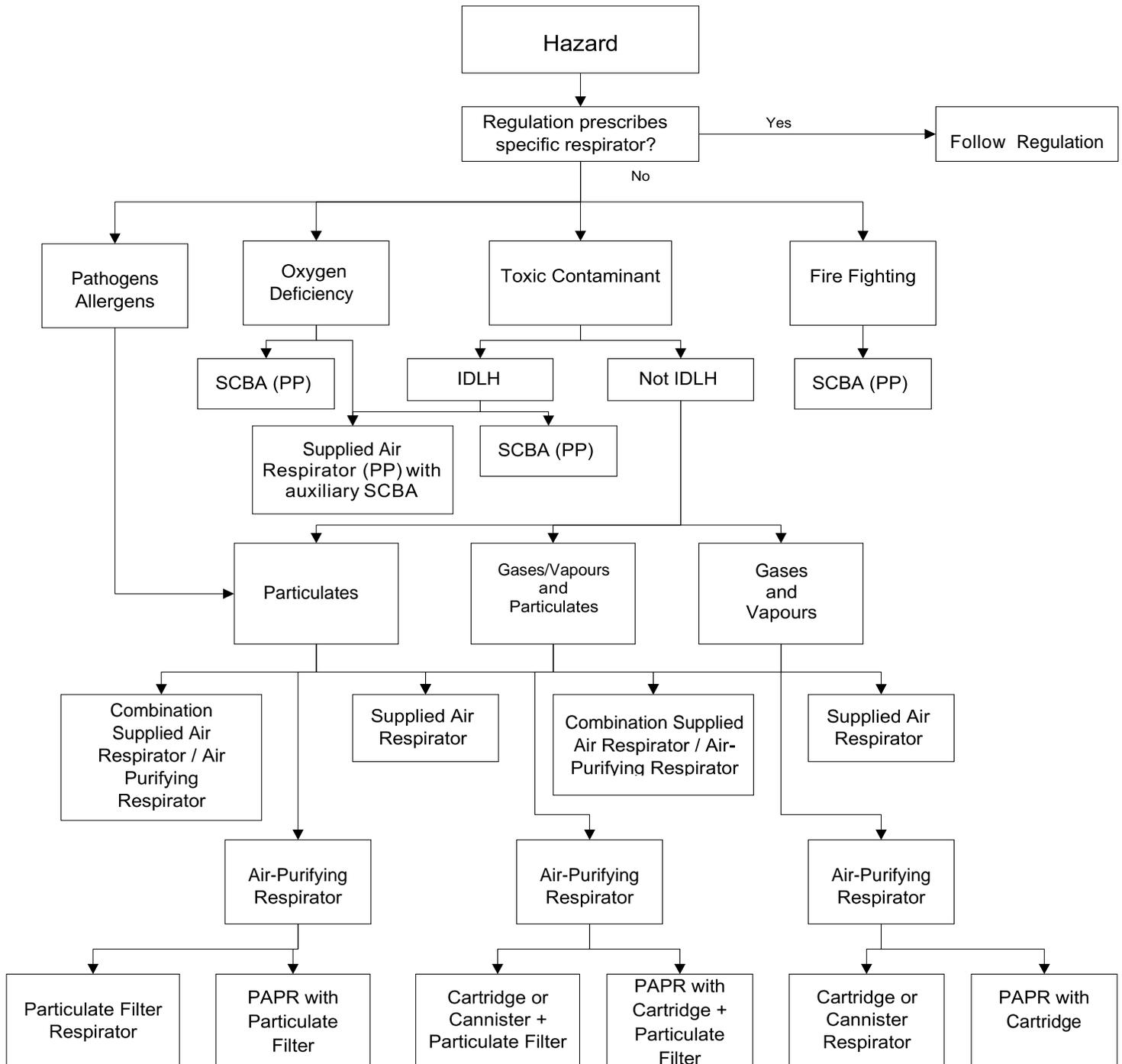
- 1) pressure demand; and
- 2) demand.

Demand SCBAs must not be used in oxygen deficient atmospheres or IDLH atmospheres because they allow the pressure inside the facepiece to become negative.

SCBAs are the most complex respirators in use today so training in the proper use and maintenance of SCBAs is crucial, particularly given the conditions in which these units are used (contact the equipment supplier for further details).



Appendix A – Guide to Respirator Selection



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