Respiratory Protection Equipment – Compliance Game Plan

The 8 steps you must take to protect workers who are required to use a respirator.

You must take measures to prevent workers from breathing in harmful mists, vapours, fumes, gases, dusts and other airborne contaminants. The best way to accomplish that objective is at the source by keeping contaminants out of the air in the first place, such as via elimination of hazardous products or mechanical ventilation. Regrettably, such solutions may not be reasonably practicable. In that situation, respiratory protection equipment becomes the critical line of defence. As safety coordinator, you must ensure that selection, use and maintenance of respiratory protective equipment meet the OHS requirements of your jurisdiction.

Do You Need a Respiratory Protection Code of Practice/Program'

Six provinces (AB, BC, NB, NL, ON, QC) require employers to implement a written code of practice or program if workers are required to use respiratory protection equipment. Creating such a program is also a best practice no matter what part of

Canada you're in. In either situation, there are 8 basic measures required to comply.

Step 1: Perform a Respiratory Hazard Assessment

Respiratory protection differs depending on the respiratory hazards it's designed to protect workers from. So, the first step is to do an assessment of the respiratory hazards in your workplace. Such an assessment must be performed by a competent person who's trained and qualified to do the necessary tests and use the testing equipment. It should cover:

Oxygen levels: Too much or too little oxygen in the air can pose hazards. So, you must calculate the oxygen levels in the work area and ensure they're within safe levels stated in your jurisdiction's OHS regulations.

Airborne contaminants: You must identify airborne contaminants to which workers may be exposed on the basis of the following factors:

- The characteristics of operations or processes as they relate to the release of air contaminants;
- How long a worker must wear a respirator and the physical demands on that worker;
- Characteristics of the work area, including layout, work activities, temperature, humidity, atmospheric pressure, escape routes and maintenance procedures;
- Materials used, produced or stored in the work area;
- The physical state of the contaminants, such as gas, dust, vapour, particulate, etc.;
- Concentration of the contaminants, which you may have to determine via air sampling, mathematical modeling or other scientific methods of analysis, and then be sure they're within the occupational exposure limit (OEL) for the particular substance listed in your jurisdiction's OHS laws; and

- Emergency factors like shutdown, escape and rescue operations.

IDLH atmosphere: Assess whether the atmosphere is immediately dangerous to life or health (IDLH), that is, it poses an immediate threat to life, would cause irreversible adverse health effects or would impair an individual's ability to escape.

Substance-specific requirements: Asbestos, lead, silica and other highly toxic substances require special measures, including use of HEPA filters, medical surveillance, etc.

Step 2: Select Appropriate Respiratory Protection Equipment

Select respirators to control the respiratory hazards you identify using the principles and flowchart in Canadian Standards Association, CSA Z94.4, *Selection, Use and Care of Respirators*. Select:

- The respirator your jurisdiction's OHS law specifically requires for the particular hazard;
- If the hazard involves abrasive blasting, a supplied-air type CE respirator or alternative respirator approved for use during abrasive blasting;
- If the atmosphere is IDHL due solely to oxygen deficiency, a demand closed-circuit self-contained breathing apparatus (SCBA);
- If the atmosphere is IDLH but oxygen deficiency isn't the only respiratory hazard, a pressure-demand SCBA or combined pressure-demand supplied-air respirator with auxiliary self-contained air supply;
- If the oxygen concentration is less than 19.5% at sea level or equivalent and there's no other respiratory hazard, any supplied-air respirator.

If there are OELs for the identified contaminants, calculate

the ‘hazard ratio’ (HR) for each one by dividing the contaminant’s airborne concentration by its OEL. Once you have HRs for each contaminant, select the highest HR (HHR) and use that ratio for the rest of the selection process.

If there are no OELs for the identified contaminants, use professional judgment to select the appropriate respiratory protection. If you don’t have enough information to do so, select a pressure-demand SCBA or combined pressure-demand supplied-air respirator with auxiliary self-contained air supply.

In the event of a low oxygen concentration combined with other respiratory hazards, select an appropriate supplied-air respirator based on the HHR:

- 10 or less: half-facepiece demand supplied-air respirator;
- 25 or less: loose-fitting facepiece/visor supplied-air respirator;
- 50 or less: pressure-demand half-facepiece supplied-air respirator;
- 100 or less: demand full-facepiece supplied-air respirator or demand SCBA;
- 1,000 or less: continuous-flow or pressure-demand full-facepiece supplied-air respirator or a helmet/hood continuous-flow supplied air option; and
- Greater than 1,000: pressure-demand SCBA or combined pressure-demand supplied-air respirator with auxiliary self-contained air supply.

If there’s no oxygen deficiency and the only hazard is the presence of contaminants, select either a supplied-air respirator based on the HHR using the above guidelines or an air-purifying option based on the following HHR guidelines:

- Five or less: quarter facepiece;
- 10 or less: half-facepiece;

- 25 or less: loose-fitting facepiece/visor powered air-purifying respirator (PAPR);
- 50 or less: half-facepiece PAPR;
- 100 or less: full facepiece;
- 1,000 or less: full facepiece or helmet/hood PAPR; and
- Greater than 1,000: because an air-purifying respirator isn’t suitable for an HHR at this level, select a pressure-demand SCBA or a combined pressure-demand supplied-air respirator with auxiliary self-contained air supply.

If the contaminant is in the form of a gas or vapour and there’s no gas and/or vapour purifying element available, you can’t select an air-purifying respirator but rather a supplied-air respirator based on the HHR. If a gas and/or vapour purifying element is available, choose the appropriate one

If there’s a particulate hazard and you’ve narrowed your choices to a PAPR style respirator, choose an He class filter. Otherwise, any R or P particulate filter if airborne oil is present, or any N, R or P particulate filter if it’s not.

Once you select the respirator type appropriate for the hazards, you must choose a brand or model that’s been approved for use in the workplace. Fed, AB, NL and ON OHS laws require respirators to be on the U.S. NIOSH Certified Equipment List. Also review the manufacturer’s specifications to ensure the respirator is suitable for your intended use.

Step 3: Ensure Respirator Properly Fits Worker

Make workers required to use respirators with a tight-fitting facepiece must undergo fit testing to verify proper fit and an effective seal using one of the following methods:

- Quantitative Fit Testing (QNFT) that detects leakage by

having the respirator user stand inside a test chamber containing a nontoxic aerosol while probes or other devices measure concentrations of the aerosol on the inside and outside of the facepiece; and

- Qualitative Fit Testing (QLFT) a non-numeric pass/fail test in which a user stands in an enclosure into which a nontoxic test agent like banana oil is introduced. If the user detects the agent, it means the facepiece is leaking and the test is a fail.

Most respirators can be tested using either QLFT or QNFT. **Exceptions:** QNFT is the only acceptable method of testing SARs, SCBA and PAPRs. You don't have to do any fit testing for mouthbit or loose-fitting respirators.

Fit testing should take place before the worker uses the respirator the first time, before a different respirator facepiece (size, style, model or make) is used and at least once a year after that. You should do additional fit tests after a worker reports or another person observes changes in the worker's physical condition that may affect respirator fit, including facial scarring, dental changes, obvious changes in body weight.

Step 4: Ensure Proper Respirator Use

Establish safe work procedures for proper respirator use in both routine and emergency situations, including:

User seal check procedures: Require workers that use respirators with tight-fitting facepieces to do a seal check before each use to verify that they put on the respirator right and that it's working properly.

Ban on use by workers with facial hair: Don't let workers use tight fitting respirators if they have facial hair or any other condition that may interfere with the seal or valve function, such as facial scars. Workers should be allowed to

use corrective glasses, goggles or other protective equipment under their facepiece as long as they wear in it a way that doesn’t interfere with the facepiece seal, distort their vision or cause any other harm.

Atmospheric monitoring: Do surveillance to detect changes to concentration levels of the contaminant, time of exposure or any other work, operation or equipment changes that may impair a respirator’s effectiveness.

Observation: There should be a procedure for observing workers using respirators for indications of discomfort or improper use.

Exit procedures: Implement procedures requiring workers to leave the area where respirators are being used:

- To wash their faces and facepieces to prevent eye or skin irritation (there should be a ‘safe area’ nearby where workers can do this);
- If they detect vapor or gas breakthrough, changes in breathing resistance or facepiece leakage; and
- To replace the respirator or the filter, cartridge or canister elements.

Procedures for IDLH atmospheres: There must be procedures for work in IDLH atmospheres to ensure that:

- At least one worker is located outside the IDLH atmosphere at all times;
- Visual, voice, or signal line communication is maintained between worker(s) in the IDLH atmosphere and worker(s) outside;
- The worker(s) located outside the IDLH atmosphere is/are trained and equipped to provide effective emergency rescue; and
- Workers are equipped with and trained to use emergency escape respirators or other escape equipment.

Compliance Pointer: In addition to these general safety procedures for IDLH and non-IDLH atmospheres, there must be specific procedures for particular kinds of hazardous work requiring respirator use, such as confined space entry, asbestos removal, abrasive blasting and structural firefighting operations.

Step 5: Ensure Proper Respirator Care, Maintenance and Storage

There must be a system to ensure that respirators and respiratory equipment is properly cleaned, disinfected, serviced and maintained in accordance with CSA 94.4 and manufacturer's instructions. SCBA, including regulators, must be serviced by a competent person and stored in a readily accessible location that's free of dust, sunlight, extreme temperatures, moisture and other conditions and contaminants that may impair its effectiveness.

Step 6: Ensure Proper Respirator Inspection

Require respirators to be inspected before each use (in Alberta, inspection is also required after each use), after each cleaning and in response to complaints or indications that the equipment isn't working properly. Inspections should be performed in accordance with manufacturer's instructions and CSA Z94.4, and include checks of:

- The respirator function, tightness of connections and condition of the various parts including, the facepiece, head straps, valves, connecting tube and cartridges, canisters or filters; and
- Elastomeric parts for pliability and signs of deterioration.

SCBA and emergency use respirators must be inspected before

they're introduced to the workplace, after each use and at least once a month to ensure that regulator and warning devices function properly and that air and oxygen cylinders are maintained in a fully charged state. Keep records of SCBA and emergency use respirator inspections listing:

- The inspection date;
- The inspector's name or signature;
- The inspection findings;
- The corrective action required, if any: and
- A serial number or other means of identifying the respirator.

Defective equipment must be immediately removed from service and not used again unless and until it's properly repaired.

Step 7: Ensure Workers Required to Use Respirators Get Proper Training

Don't let workers use respirators unless and until they receive training on the equipment's use, limitations and care covering, at a minimum:

- Why they must use a respirator;
- How improper fit, use or maintenance can hurt a respirator's effectiveness;
- How the particular respirators they must use, including the cartridges, work to protect them;
- The limitations of the respirator they use;
- The risk of malfunction, types of emergencies that may arise and the procedures in place for responding to them;
- How to put on and remove the respirator;
- How to inspect and check the respirator;
- How to perform seal checks; and
- How to clean, maintain and store the respirator.

Verify that workers understood their training. **Best practice**:

Require them to demonstrate proper respirator use, seal checking, etc. after training ends.

Step 8: Keep Proper Records

Finally, you must retain and make available to workers, their representatives and OHS officials upon request for inspection and copying records of respirator fit testing, training, maintenance and inspection.