

OVERVIEW OF PART 8 AND 31 AMENDMENTS: PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT & FIREFIGHTING

Employers in the health sector requested that the WCB amend Part 8 of the Occupational Health and Safety Regulation (*OHSR*) regarding respiratory protection by repealing the references to the 1993 edition of the CSA Standard regarding the selection, use and care of respirators (*CSA Z94.4-93*) and adopting the 2002 edition. The health sector employers note that the 2002 standard was developed by the CSA Respiratory Protection Committee, comprised of experts in the field of respiratory protection, and that the *OHSR* should reflect these most current industry-acceptable standards. In particular, stakeholders are interested in adopting a two year cycle of fit testing as permitted by the 2002 standard (although the new standard permits a two year cycle, it recommends annual fit testing). In response, a WCB working group has reviewed the new edition of the Standard and sections of the *OHSR* regarding respirators.

The working group acknowledges that the latest edition of the standard provides new information and updated procedures on the use and care of respirators that would maintain or improve worker safety and should be adopted. However, some issues were noted regarding the respiratory selection process. The process for selecting respiratory devices has been significantly revised in the 2002 edition of *CSA Z94.4*, moving far beyond the general selection principles in the 1993 edition. The new standard introduces new selection criteria such as hazard ratios and highest hazard ratios, and requires the use of CSA prescribed protection factors to follow a very detailed flow chart process for selecting appropriate respirators. Adopting the new selection process would require some fundamental changes to the requirements around respirators, including the need to adopt the CSA table of protection factors (the regulation currently establishes a "made in BC" table of protection factors), and would require a significant education program both for stakeholders and WCB employees. More analysis would be needed to determine the implications of adopting the selection process outlined in the new edition of the standard. Consequently, it is recommended that the Part 8 requirement regarding selection continue to reference *CSA Z94.4-93* at this time.

As part of its review, the working group also examined the references to respirators found in Part 31 (Firefighting). As in Part 8, a number of the requirements reference the CSA Standard regarding the selection, use and care of respirators. Where appropriate, it is proposed that these references also be updated to adopt the new edition of the Standard. Further, the working group noted that some requirements in Part 31 either duplicate requirements that already exist in Part 8 or are requirements that should apply to all users of SCBA respirators rather than just to firefighters. This proposal includes amendments associated with these issues.

Finally, this proposal also includes amendments to Part 8 that are not associated with the adoption of the new CSA Standard regarding the selection, use and care of respirators, but that were deemed appropriate by the working group. In each case, the rationale for the change is provided in an explanatory note following the proposed amendment.

The main proposed revisions to Part 8 and Part 31 are as follows:

- References to the 1993 edition of the CSA Standard for the use and care of respirators are repealed and replaced with references to the 2002 edition (with the exception of section 8.33 regarding respirator selection).
- Table 8-1 (Respirator Protection Factors) is revised to include an additional type of respirator and to define air purifying respirators as non-powered.
- Requirements for annual fit testing revised to detail circumstances in which a fit test must be conducted prior to the one year anniversary of the last fit test.
- Part 8 references to the 1985 edition of CSA Standard on compressed breathing air and systems revised to reference the 2000 edition. Additional section added regarding compressed breathing air storage limitations.

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- Additional requirements added to Part 8 regarding records, maintenance and inspection for SCBAs and related air cylinders.
- Repeal of sections in Part 31 that duplicate requirements already established in Part 8.

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PART 8: PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

Definitions	8.1	In this Part
“fit check”		Means a negative or positive pressure check of a respirator’s fit, performed in accordance with the manufacturer’s instructions
“fit test”		means a quantitative or qualitative fit test performed in accordance with procedures in CSA Standard CAN/CSA-Z94.4-93, Selection, Use and Care of Respirators

Explanatory Note

It is proposed that the definition for “fit check” be deleted because it is currently defined in section 8.41. In addition, proposed amendments to 8.41 (see proposed amendments on page 9) further define what constitutes a proper “fit check”.

In addition, it is proposed that the definition of a “fit test” be deleted as it is better suited as part of the “fit test” requirements in section 8.40 (see proposed amendments to section 8.40 on page 7).

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Protection factors 8.34 A respirator must not be used for protection against concentrations of an air contaminant greater than the maximum use concentration, which is the concentration determined by multiplying the exposure limit for the air contaminant by the appropriate respirator protection factor selected from Table 8-1, or as otherwise determined by the Board.

Table 8-1: Respirator protection factors

Respirator type	Protection Factor
Air purifying	
Non-elastomeric or paper type (disposable)	5
Half facepiece, non-powered	10
Full facepiece, non-powered	50
Loose-fitting facepiece powered (PAPR)	25
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	1000
Air supplying	
Airline - demand (negative pressure)	
Half facepiece	10
Full facepiece	50
Airline - continuous flow	
Loose-fitting facepiece/hoods	25
Half facepiece	50
Full facepiece	1,000
Helmet/hood	1,000
Airline - pressure demand (positive pressure)	
Half facepiece	50
Full facepiece	1,000
Full facepiece, with egress bottle	10,000
Self-contained breathing apparatus (SCBA)	
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 CSA Standard CAN/CSA-Z94.4-93 standards acceptable to the Board for further information.	

Explanatory Note

Table 8-1 of section 8.34 provides protection factors (“PF”) to be used in determining the maximum use concentrations for different types of respirators. The protection factors, and the types of respirators detailed in Table 8-1 are similar, but do not mirror, the protection factors, and the types of respirators detailed in the CSA standard for respirators or those detailed in respiratory equipment standards from other sources such as American National Standards Institute, Occupational Safety and Health Agency or National Institute of Occupational Safety and Health.

Table 8-1 is a uniquely “made-in-BC” set of protection factors for respirators that shares much in common with other respirator standards, but that has been developed, in consultation with stakeholders in a former regulation review process, to best meet the needs of workers in BC. For example, Table 8-1 assigns a PF of 100 to full facepiece PAPR (powered air purifying respirator) fitted with HEPA (high efficiency particulate air) filters for exposure to asbestos while CSA assigns a PF of 1000 and disregards the asbestos factor (i.e., carcinogenic properties of asbestos) as do ANSI, NIOSH and OSHA.

It is proposed that Table 8-1 be retained with the following amendments:

- 1) It is proposed that the reference to a “non-elastomeric or paper type (disposable)” respirator with assigned protection factor of 5 be repealed to reflect that this type of device is no longer manufactured or commercially available.
- 2) Because the term “air purifying” holds little meaning for most employers and workers, it is proposed that the term “non-powered” be added to both the air purifying half facepiece and full facepiece respirator to distinguish these devices more clearly from powered devices.
- 3) It is proposed that a reference to a full facepiece PAPR for protection from contaminants other than asbestos be added to the table with an assigned protection factor of 1000. Reference to this device was inadvertently left out of Table 8-1 during preparation of the 1996/98 OHSR. This is consistent with *CSA Standard CAN/CSA Z94.4-02*.
- 4) It is proposed that the footnote in Table 8-1 include the terms “IDLH”(Immediately Dangerous to Life and Health), which is an important consideration when applying protection factors *vis-à-vis* maximum use concentrations; and “canister”, which clarifies that respirator sorbent beds come in two sizes. As well, it is proposed that the reference to *CSA Standard CAN/CSA-Z94.4-93* be replaced with a reference to “standards acceptable to the Board”. This will allow a guideline to provide a range of acceptable standards to better assist a range of industries.

PART 8: PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

- Respirable air quality** **8.37** **(1)** Compressed breathing air supplied for equipment such as an SCBA and a supplied air respirator must be tested at least annually to ensure that the air being supplied meets the requirements of *CSA Standard CAN/CSA-~~Z180.1-1985~~ Z180.1-2000 Compressed Breathing Air and Systems*.
- (2)** If an SCBA cylinder has not been used for a period in excess of one year, air in the cylinder must be slowly depressurized to atmosphere and refilled with compressed breathing air meeting the requirements of *CSA Standard CAN/CSA-Z180.1-00, Compressed Breathing Air and Systems*.
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Explanatory Note

It is proposed that the reference to the 1985 edition of the CSA Standard in section 8.37(1) be repealed and the 2000 edition adopted. Table 1 of Z180.1 has been the operating standard for the evaluation of the quality of air from compressed respirable air cylinders since the late 1980s in BC. Adopting the 2000 Standard will ensure that the most current testing protocols are applied in BC. The updates include: a refinement of the testing criteria for the presence for water vapour, a reduction in the maximum allowable concentration in the air sample for methane, a refinement to the definition of “volatile non-methane hydrocarbons”, and a requirement to investigate the source and nature of any discernable odours in an air sample.

It is also proposed that section 8.37(3) be added, establishing a requirement that self-contained breathing apparatus (SCBA) cylinders be refilled once a year. WCB’s “*Breathe Safer*” manual (publication BK75) suggests a 6-month refill for cylinders, in part, because of the prevalence of steel cylinders prior to the 1990s. Steel cylinders are prone to rusting which could result in the lowering of the cylinder’s oxygen content. The growth in the number of cylinders constructed of materials less prone to rusting than steel, such as aluminium and composite, along with the use of more effective water vapour scrubbing systems on compressed breathing air filling systems has significantly reduced concerns about oxygen loss due to rusting. The proposed requirement for an annual recharge of air cylinders mirrors clause 10.5.5.2 of CSA Z94.4-02.

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- Fit tests** **8.40** (1) A respirator which requires an effective seal with the face for proper functioning must not be issued to a worker unless a fit test demonstrates that the facepiece forms an effective seal with the wearer's face.
- (2) ~~Subsection (1) does not apply to a single use disposable) respirator unless the manufacturer's instructions indicate that a fit test can be performed.~~ **Fit tests must be performed in accordance with procedures in CSA Standard CAN/CSA-Z94.4-02, Selection, Use and Care of Respirators.**
- (2.1) A fit test must be carried out**
- (a) before initial use of a respirator,**
 - (b) at least once a year,**
 - (c) whenever there is a change in respirator facepiece including the brand, model, and size, and**
 - (d) whenever changes to the user's physical condition could affect the respirator fit.**
- (3) Other personal protective equipment that is to be worn at the same time as a respirator and which could interfere with the respirator fit must be worn during a fit test.
- ~~(4) After a respirator is issued to a worker, the fit test must be repeated at least annually to ensure that the faced seal remains effective.~~

Explanatory Note

It is proposed that section 8.40(2) be amended to repeal the reference to disposable type respirators that are no longer commercially available, and replaced with an amended version of the definition of a fit test currently found in section 8.1 (see the consequential repeal of "fit test" in section 8.1 on page 2). The revised definition eliminates a reference in the original fit test definition to fit tests being qualitative or quantitative in nature. All fit tests are either qualitative or quantitative and the reference to these descriptors is unnecessary. In addition, it is proposed that fit tests be conducted in accordance with the 2002 edition of CSA Z94.4 rather than the 1993 edition. The fit test requirements in the 2002 standard are similar to those in the 1993 edition. The 2002 edition does however, reflect new testing methods developed and introduced into the marketplace since 1993. Specifically the following methods were added:

- Bitter aerosol (Bitrex® denatonium benzoate) which essentially replaces the amyl acetate (banana oil) method
- Quantitative fit testing using particle counting measuring equipment (aerosol photometers; single particle counters)
- Quantitative fit testing using controlled negative-pressure (CNP) quantification instrumentation.

It is noted that a number of firms in a variety of industries have been using the 2002 prescribed methods since the early 1990s for fit testing purposes.

It is also proposed that a new subsection (2.1) be added providing expanded requirements around when a fit test must be conducted. Although some employers in the health care sector have expressed a desire for the OHSR to adopt a two year cycle for fit testing instead of the current annual fit testing requirement, the working group noted that there are no strong scientific studies that indicate that biennial fit testing is as effective as or better than annual fit testing. In the absence of conclusive scientific support for a change it is proposed that the current annual fit testing requirement remain. However, it is recognized that there are situations that could affect the fit of a respirator prior to a user's annual fit test. It is proposed that fit testing requirements include fit testing prior to the one year anniversary of the previous fit test if a user's physical condition or changes to respirator components could affect the

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respirator fit.

The proposed repeal of subsection (4) is a consequential amendment to the proposed addition of subsection (2.1).

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Fit-check	8.41	(1) Before each use of a respirator which requires an effective seal with the face for proper functioning, a worker must perform a positive or negative pressure fit user seal check in accordance with <i>CSA Standard CAN/CSA-Z94.4-02, Selection, Use Care of Respirators.</i>
User seal check		(2) Subsection (1) does not apply to a single use (disposable) respirator, or to the emergency use of an escape respirator.

Explanatory Note

It is proposed that section 8.41(1) require a fit check be conducted in accordance with *CSA Standard CAN/CSA-Z94.4-02*. The 2002 edition of the Standard describes, in greater detail than the 1993 edition, the proper procedures for carrying out a fit check and would ensure consistency among users of respiratory protective equipment. In addition, it is proposed that the section replace references to “fit check” with “user seal check”. The term “fit checking” is often confused with the term “fit testing”, while the term “user seal check” is generally accepted terminology and is the term used in the *CSA Standard*.

The proposed amendment to section 8.41(2) repeals the reference to a single use (disposable) respirator because it is no longer manufactured.

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Records	8.44	The employer must maintain a record of: <ul style="list-style-type: none">(a) fit test results and worker instruction, and(b) maintenance for air-supplying respirators, powered air purifying respirators, and sorbent cartridges and canisters, and(c) maintenance and repairs for each self-contained breathing apparatus and all air cylinders in accordance with the requirements of CSA Standard CAN/CSA-Z94.4-02, Selection, Use, and Care of Respirators.
Maintenance and inspections	8.45	<p>(1) Inspection of compressed air cylinders must be done in accordance with CSA Standard CAN/CSA-Z94.4-02, Selection, Use and Care of Respirators.</p> <p>(2) Self-contained breathing apparatus, including regulators, must be serviced and repaired by qualified persons.</p> <p>(3) Compressed air cylinders must be hydrostatically tested in accordance with CSA Standard CAN/CSA-B339-96, Cylinders, Spheres, and Tubes for the Transportation of Dangerous Goods.</p>

Explanatory Note

Section 8.44 outlines record keeping requirements for respirator fit testing and worker instruction, and maintenance on all types of respirators except self contained breathing apparatus (SCBA) and related air cylinders. Currently, a requirement for keeping maintenance and repair records for SCBA and related air cylinders, in accordance with the 1993 edition of the CSA Standard, exists in Part 31 (Firefighting) of the Regulation.

It is proposed that the requirements for record keeping of maintenance and repairs to SCBA and related air cylinders should apply to all industries to further the goal of worker safety. Accordingly, section 8.44 is amended to include subsection (c) which adopts the requirements for record keeping of maintenance and repair of SCBA and related air cylinders that exist in section 31.26(4). The consequential repeal of section 31.26(4) is found on page 13. The proposed amendment also adopts the 2002 edition of the CSA Standard to be consistent with its adoption in other respirator sections of Part 8. The 2002 edition of the Standard mirrors the requirements of the contents of an inspection record for the SCBA and air cylinders in the 1993 edition.

A new section regarding the maintenance and inspection of SCBA and related air cylinders is proposed. These requirements currently exist in section 31.26(1)-(3). Much like with records, in an effort to further worker safety it is proposed that the requirements regarding maintenance and inspection of SCBA and related air cylinders found in Part 31 be adopted in Part 8 to apply users of SCBA and related air cylinders. The consequential repeal of section 31.26(1)-(3) can be found on page 13.

It is proposed that section 8.45(1) reference the 2002 edition of the CSA Standard regarding the selection, use and care of respirators instead of the 1993 edition as is the case with this requirement as it currently resides in section 31.26(2). The 2002 edition no longer carries an inspection clause specific to fire services, but rather, provides an inspection section that applies to any and all users of SCBAs where the focus is on emergency use of this type of equipment. In part, the new Standard states that "SCBA shall be inspected on a schedule to ensure readiness for the anticipated emergency use". As a result, the new edition of the Standard is better suited for the newly amended requirement. It is anticipated that a guideline will accompany this section to clarify a schedule of inspections for regularly staffed fire

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departments, volunteer fire departments and other users.

It is proposed that subsection (3) reference the 1996 edition of the CSA Standard regarding cylinders, spheres, and tubes for the transportation of dangerous goods instead of the 1988 edition as is the case with this requirement as it currently resides in section 31.26(3). Requirements for hydrostatic testing in the 1996 edition are similar to those set out in the 1988 edition. Both require hydrostatic testing (volumetric expansion and proof pressure testing) in accordance with CGA Publication C-1. It is also noted that cylinders manufactured prior to 1996 need only conform to the standard referred to in the Occupational Health and Safety Regulation (*OHSR*) or the edition of the standard published at the time the cylinder was manufactured in accordance with section 4.4(1) of the *OHSR*.

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PART 31: FIREFIGHTING

Operation of SCBA	31.21	Respirators must be used in accordance with <i>CSA Standard CAN/CSA-Z94.4-9302, Selection, Use and Care of Respirators, Section Clause 9.1.</i>
Sealing and fit testing	31.22	<p>(1) Firefighters who use a self-contained breathing apparatus must be clean shaven to ensure that the mask forms a positive seal against the face.</p> <p>(2) Fit tests must be performed in accordance with <i>CSA Standard CAN/CSA-Z94.4-93 Selection, Use, and Care of Respirators.</i></p> <p>(3) Personal protective equipment that is worn with self-contained breathing apparatus and might interfere with a proper fit must be worn during the fit test.</p> <p>(4) Only corrective eyewear designed for use with self-contained breathing apparatus may be worn.</p>
Air quality and sampling	31.24	<p>(1) The employer must ensure that air used for breathing purposes meets the requirements of <i>CSA Standard CAN/CSA-Z180.1-M85, Compressed Breathing Air and Systems.</i></p> <p>(2) The air must be tested at least once annually in a manner acceptable to the Board.</p>
Maintenance and records	31.26	<p>(1) Self-contained breathing apparatus, including regulators, must be serviced and repaired by qualified persons.</p> <p>(2) Inspection of compressed air cylinders must be in accordance with <i>CSA Standard CAN/CSA-Z94.4-93, Selection, Use, and Care of Respirators (sections 10.3.4-10.4, inclusive).</i></p> <p>(3) Compressed air cylinders must be hydrostatically tested in accordance with <i>CSA Standard CAN/CSA-B339-88, Cylinders, Spheres, and Tubes for the Transportation of Dangerous Goods.</i></p> <p>(4) Complete maintenance and repair records for each self-contained breathing apparatus and all air cylinders must be kept in accordance with the requirements of <i>CSA Standard CAN/CSA-Z94.4-93, Selection, Use, and Care of Respirators (section 10.3.5.1-b to f, inclusive).</i></p>

Explanatory Note

It is proposed that section 31.21 be amended to repeal the reference to CSA Z94.4-93 and adopt the 2002 edition of the Standard. Clause 9.1 of CSA Z94.4-02 is mirrors clause 9.1 of CSA Z94.4-93 with one exception, the requirements for “breathing gas” (compressed air quality requirements per CSA Z180.1). However, section 8.37 of the OHSR currently provides this requirement. This proposed amendment adopts the 2002 CSA Standard to be consistent with its adoption in other respirator sections of Part 8.

It is proposed that sections 31.22(1) and (4) be repealed because the same requirements are already found in sections 8.39(2) and 8.38(1) respectively. These sections read as follows:

8.38 Corrective eyewear

(1) If a worker who wears prescription eyeglasses is required to wear a full facepiece respirator, the eyewear employer must assess the work to be performed, and provide appropriate specialty corrective eyewear if necessary to ensure that the work can be performed safely.

8.39 Face seal

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(2) A worker required to wear a respirator which requires an effective seal with the face for proper functioning must be clean shaven where the respirator seals with the face.

In addition, the repeal of sections 31.22(2) and (3) are proposed as consequential amendments to changes in section 8.40(2) and (4) (see proposed amendments on page 7).

It is proposed that section 31.24 be repealed as it simply duplicates existing requirements found in section 8.37 (see proposed amendments to 8.37 on page 6).

The proposed repeal of section 31.26 is a consequential amendment flowing from the changes proposed in sections 8.44 and 8.45 (see proposed amendments on page 10).

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