

Legislation – Compressed Breathing Air Systems

Atmosphere-supplying respirators

6.15.1 An employer must ensure that air in an atmosphere-supplying respirator that is provided to a worker meets the purity requirements set out in CAN/CSA Standard-Z180.1-13, *Compressed Breathing Air and Systems*.

Table 1 of Z180.1-13 is provided below

Component	Allowable concentration
Oxygen	20–22%
Nitrogen and rare gases	78–80%
Carbon monoxide	≤ 5 mL/m ³ (ppm)*
Carbon dioxide	≤ 600 mL/m ³ (ppm)*
Methane	≤ 10 mL/m ³ (ppm)*
Volatile non-methane hydrocarbons†	≤ 5 mL/m ³ (ppm)* as methane equivalents
Volatile halogenated hydrocarbons†	≤ 5 mL/m ³ (ppm)*
Oil, particulates, and condensates	≤ 1 mg/m ³
Water — compressed breathing air pipelines or respirators at pressures less than 15.3 MPa (2216 psig)	The pressure dew point of compressed breathing air at pressures less than 15.3 MPa (2216 psig) shall be at least 5 °C (9°F) below the lowest temperature to which any part of the compressed breathing air pipeline or the respirator can be exposed at any season of the year in the applicable geographic location. The air delivered by an ambient air system operating at pressures at or below 103.4 kPa (15 psig) shall not be required to meet this pressure dew point requirement. (Refer to Tables 3 and 4 for typical pressure dew point requirements from 344.8 to 2069 kPa [50 to 300 psig].)
Water — cylinders and piping at pressures equal to or greater than 15.3 MPa (2216 psig)	Compressed breathing air in cylinders or piping operating at pressures equal to or greater than 15.3 MPa (2216 psig) (a) shall have an atmospheric dew point not exceeding –53 °C (–63°F) or a water vapour concentration not exceeding 27 mL/m ³ (ppm) ±10%; and (b) should have a pressure dew point at least 5 °C (9°F) below the lowest anticipated operating temperature and a corresponding atmospheric dew point not exceeding the values specified in Table 5 in °C (°F) or water vapour content in ppm (by volume) ±10%.
Odours	Any pronounced odour detected by smell in a compressed breathing air sample being analyzed shall be cause for failure of the sample. The source and nature of the odour shall be investigated and resolved.

*1 mL/m³ = 1 ppm by volume.

†The components of volatile non-methane and halogenated hydrocarbons should not exceed one-tenth of their respective occupational exposure limits recognized by the authority having jurisdiction.

Notes:

(1) The values in this Table have been chosen to ensure that the quality of compressed breathing air would be comparable to that of normal air (see [Table 2](#)).

(2) Refer to the National Building Code of Canada for temperature conditions in Canada.

The CSA standard also lays out minimum guidelines for airflow. This is to ensure that the worker gets enough airflow to keep the facepiece under positive pressure. Presumably the intent of the regulation is that a unit should also comply with the volumetric airflow specified in the CSA Standard. The flowrates specified in Z180.1-13 are provided below.

A.2.3

The minimum airflow rate requirements for air-supplied respirators can vary from 114 L/min (4 cfm) (for tight-fitting facepieces) and 170 L/min (6 cfm) (for loose-fitting helmets/hoods) to a maximum of 425 L/min (15 cfm) at rated pressures ranging from 241 to 827 kPa (35 to 120 psig). If supplied-air suits are being used, the airflow rates can increase significantly.

Note: For specific airflow rates and pressure ratings, contact the manufacturer or supplier of the equipment.

Supplied Air Respirators are also mentioned in the Definitions of a Serious Incident.

Definition: “serious incident”

2.6 In sections 2.7 to 2.9, “serious incident” means an incident

- (c) that involves
 - (i) the collapse or structural failure of a building, structure, crane, hoist, lift, temporary support system or excavation,
 - (ii) an explosion, fire or flood,
 - (iii) an uncontrolled spill or escape of a hazardous substance, or
 - (iv) the failure of an atmosphere-supplying respirator.