

Standards Summary Sheet

CSA Standard Z180.1-13 Compressed Breathing Air and Systems

Scope and Application:

This standard sets out the minimum requirements for the purity of compressed breathing air supplied to service outlets, and for breathing air systems required to produce, store and distribute such air. The standard outlines requirements applicable to the design, construction, testing, commissioning, calibration, operation and maintenance of the breathing air system components.

The standard is limited to compressed breathing air and compressed breathing air systems used for:

- supplied-air respirators
- supplied-air suits
- self-contained breathing apparatus (SCBA) (open-circuit), and
- other applications where the requirements to reference the compressed breathing air purity requirements are necessary

Definitions:

Compressed Breathing Air – Normal air processed by a compressed breathing air system meeting the purity requirements of this standard.

Compressed Breathing Air System – An assembly of various components e.g. air intake, ambient air system, purification system, compressor, receiver, piping, fittings, cylinder, proportioning system, compressed breathing air pipeline, control equipment, etc. required to produce and/or deliver compressed breathing air to its user.

Purification System – Any chemical, mechanical or physical device or control equipment, or combination used to remove contaminants in air to produce compressed breathing air.

Compressed breathing is required to be produced and delivered by a compressed breathing air system.

(see over)

System Requirements

- The system and purification systems, when part of the compressed breathing air system are to be designed, constructed, installed, commissioned, operated, calibrated, tested, inspected, maintained and repaired according to manufacturer's instructions.
- Be capable of delivering a supply of compressed breathing air to every user in the quantity, quality and rated pressure(s) required during normal and emergency procedures.
- Be tested to make sure that the requirements of this standard are met for the operation and commissioning of the system.
- *Oil lubricated air compressors* require: audible inline carbon monoxide alarms, fail safe switches to active visible and audible alarms (for low oil pressure and high temperature situations), a high-pressure shutdown switch, check valves and instruction manual/operating logbook. Only oils recommended for breathing air applications (by the compressor and oil manufacturers) are required for use in breathing air systems.

Sampling/Analyses of compressed breathing air:

Sampling:

- Samples collected must follow the procedures outlined in this standard and be analyzed by an accredited lab
- A sample of compressed breathing air produced and delivered by a compressed breathing air system must be collected and analyzed every six months (or as specified by the authority having jurisdiction)

Analyses:

The analyses and values listed are selected to provide a quality of compressed breathing air similar to good quality outdoor air. When the testing shows unacceptable levels of contaminants, the system is then taken out of service and re-inspected.

Analyses and values requirements are as follows:

- Oxygen level: 20–22% by volume
- Nitrogen and Rare Gases levels: 78–80% by volume
- Carbon monoxide level: not more than 5 ppm
- Carbon dioxide level: not more than 600 ppm
- Methane level: not more than 10 ppm
- Volatile non-methane hydrocarbons levels: not more than 5 ppm (as methane equivalent)
- Volatile halogenated hydrocarbons levels: not more than 5 ppm

(see over)

- Oil, particulates and condensates: not more than 1 mg/m³
- Pressure < 15.3 MPa: at a dew point 5°C under the lowest temperature it's exposed to during the year
- Pressure > 15.3 MPa: at a dew point not more than – 53°C or water vapour level not more than 27 ppm (by volume)
- Odour: any noticeable odour must be analyzed

Air intakes are required to be situated in accordance with manufacturer's specification and in accordance with this standard to minimize the intake of contaminants including:

- The clear identification of the breathing air inlet (label or placard) to prevent the storage or introduction of contaminants in the area
- Placement in an area free from potential contamination
- When outdoors, attention given to nearby ventilation outlets and other potential sources of contamination (e.g., close by industrial activity, equipment and vehicle exhaust); where practical, outdoors, a minimum of 15 m upwind from a potential source of contamination, a minimum of 3 m above grade and equipped with a wind direction indicator
- maintained and protected from biological hazards or entry by pests or vermin

Additional Testing Required:

- once every six months
- additional testing at regular intervals is recommended, due to the number of compressed breathing air systems in the market
- re-testing of the system, when any major overhaul or extensive repair is done

Normal maintenance and replacement of the purification media in the system does not require additional testing.

This bulletin contains a summary of excerpts taken from the Standard, for general information purposes only. This bulletin is not reflective of the complete requirements that the Standard prescribes.

Note: *Manitoba Regulation M.R. 217/2006 Section 1.4* inconsistency:

If there is an inconsistency between this regulation and a requirement contained in a publication, code or standard referenced in this regulation, the provisions in this regulation prevail.

Last reviewed/revised: December 2016