

CSA Standard Z180.1-00 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 for the design, construction, testing commissioning, operation and maintenance of components. In addition, it provides requirements for compressed breathing air systems that supply compressed breathing air along with accepted respirators.

This 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 air systems are required to meet the following:

- Compressed breathing air is produced and delivered by a compressed breathing air system or by an automatically controlled proportioning system.

System Requirements:

- The system and purification systems, when part of the compressed breathing air system are to be designed, constructed, installed, commissioned, operated and maintained 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: carbon monoxide and high temperature alarms, fail safe switches, a high-pressure shutdown switch, check valves and instruction manual/operating logbook.

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 6-months (or as specified by the authority having jurisdiction)

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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 reinspected.

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 500 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
- Oil, particulates and condensates: not more than 1 mg/m³
- Pressure < 15.3 MPa: at a dew point 5°C under the lowest temperature its 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

Additional Testing Required:

- once every 6-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.