

RECOMMENDED PROCEDURE FOR TESTING PURIFIED AIR

The testing of high pressure breathing air can often result in a failure to meet the CSA standard unless procedures are followed to avoid obtaining inaccurate results. There are four factors that are often found that can lead to an incorrect test of the air sample. If the sample is not taken in the most controlled manner an air test can fail on one or more of these. The main failure reasons are listed below and the sample method is provided to assist the technician to avoid receiving an incorrect test result when complying with the current and (NEW pending CSA breathing Air Standard CAN/CSA-Z180.1-09).

1. High Moisture: this can occur if the test cylinder has not been properly controlled or purged; a long synthetic sample hose will raise dew point.
2. High Carbon Dioxide: this condition is normally due to high atmospheric levels of CO₂ from local industry. If the condition is a normal occurrence then a CO₂ removal inlet scrubber or a CO₂ removing high pressure chamber must be added to the compressor. Ensuring a clean source of the compressor fresh air intake away from any potential source of CO or CO₂ contamination will help to avoid failed test results.
3. High Oxygen: this is an unusual test failure and it will occur with a new drying/purifying cartridge change out. If the test is done with very little compressor running time prior to taking the air sample the molecular sieve bed will adsorb nitrogen and increase the oxygen content of the air. This is a short-term effect and stabilizes once the compressor has run for 60 minutes or longer and the cartridge purged. See air test procedures.
4. Test Equipment Calibration: this is the least common reason for a test failure. The testing lab must ensure that the equipment is correctly calibrated. Always use a recognized and accredited air test facility for the CSA air testing.

PLEASE NOTE: The nature of the air stream adsorbing desiccant and the other cartridge materials is they will initially store and release various gases (O₂ & CO₂) back into the air stream unless the system is purged.

In order to have an accurate test the following procedures will correct for these physical properties of the cartridge materials and help to ensure accurate test results.

AIR TEST PROCEDURES:

- Follow the manufacturers recommended procedure for the filter change intervals as well as the CSA standard requirements.
- Check the setting of the Pressure Maintaining Valve (PMV) and ensure it is set at 1800 PSIG to 2500 PSIG to provide efficient adsorption of moisture and other impurities by the filter cartridge.
- Operate the compressor for 90 to 120 minutes before proceeding with the air test.
- In order to balance the new cartridge the filter system must be depressurized to about 200 PSIG three times to release the retained O₂ and CO₂ from within the desiccant cell structure. Note: always depressurize the filter system slowly to avoid any damage to the cartridge.
- After 60 minutes of operation slowly open the lower vent valve on the PMV valve and bleed out the pressure in the filter system. This must be done slowly to avoid physical damage to the filter media due to rapid depressurization of the system.
- To avoid any issues of rapid decompression of the filter system it is prudent to consider the install of an orifice up-stream of the vent valve.
- Closed the valve and allow the unit to come up to pressure, repeat this twice more to ensure any adsorbed O₂ or CO₂ has come out of the adsorbing materials.
- Isolate the storage system (Close valves)
- Connect the sample cylinder directly to the compressor discharge point located after the filter system or at the fill station. It is important to verify the system air quality, always test at the SCBA fill point. Using a stainless steel connecting line to the fill station will ensure the most accurate test results. A long length of high-pressure flex hose can affect the moisture content of the air due to moisture migration into the hose material.
- Follow the accredited laboratory's procedure for filling the sample cylinder. When using another sample cylinder, it is a safe practice to purge and leave a positive pressure of 200 PSIG in the sample cylinder before taking the actual test sample. The positive pressure of 200 PSIG will avoid any atmospheric moisture entering the cylinder during the purging process.
- Now the system is ready and the test sample can be taken with the confidence that it will be accurate and provide the desired test results.
- Fill the test cylinder and send it to the testing lab. Do not use a non-certified test cylinder such as a SCBA or other cylinder. The testing lab will provide a certified dry and clean sample cylinder to assure test accuracy.
- The CSA standard requires the air test to be done by an approved and certified testing facility every 6 months. Valid test results can only be achieved by using the air test cylinder supplied by the certified and Canadian approved Air Testing Facility.
- Contact CSA for a list of the approved testing facilities to ensure that you are being provided with a fully Canadian Standard (CSA) approved and certified air test.

GENERAL RECOMMENDATIONS:

CSA has recommendations for ensuring the operation of a safe high pressure breathing air system. Please obtain a copy of the current standard to ensure your system complies with all local and federal agencies. Compliance with the Provincial Boiler and Pressure Vessels Department and the Worker Safety Department is a part of the CSA standard.

- All operators of high pressure breathing air systems are to be trained thoroughly to follow correct procedures for the handling and recharging of SCBA cylinders. All operator/service training is to be done by a certified representative for the equipment installed.
- Jordair recommends that all operators and service persons should attend a refresher course every 2-years to remain current and learn any new regulations or safety updates.
- Supplementary to the CSA required 6 month air test, Jordair recommends an air sample tube test is taken of the air system every 3 months. This simple test will ensure that the breathing air within the operational period of the cartridge is meeting the CSA standard right up to the change out of the cartridge. This tube test method can be done more often if desired.
- The Bauer Air test kit available from Jordair will provide this level of safety and operator security during the full cartridge live. The kit comes with a full selection of sampling tubes.
- Removal of a filter cartridge to check a litmus color strip supplied on some manufactures filter cartridges is not recommended. The process of opening the chamber and removal of the cartridge will contaminate the inside of the chamber with moisture and will affect air quality.
- High pressure 4.5 & 5.5 SCBA cylinders and 5000 PSIG as well as 6000 PSIG systems require factory certified, properly trained operators and technical service people to ensure safe filling of SCBA cylinders. See the CSA standard.
- There is no method to control the ambient air to a compressor. The CSA standard states all diesel and gasoline units shall be equipped with a CO monitoring system and alarm feature. The CSA standard also states that electric drive compressors are to be equipped with a CO monitor with alarm and unit shut down feature, unless the operator can be 100% assured that CO cannot enter the intake of the compressor.