

Operating Guideline # 312

Multi Gas Portable Gas Monitors

September 30, 2019



**PURPOSE:**

The purpose of this Operating Guideline (OG) is to establish guidelines for the use of the MSA ALTAIR 4X multi-gas detector.

**ISSUE/RATIONALE:**

There are literally hundreds of fire gases that are produced in fire and related emergency incidents. These are mostly invisible and undetectable without the use of special devices designed specifically for such a purpose. Many of these gases are toxic and pose a danger to both firefighters and members of the public alike. No practical method exists for measuring every conceivable gas that we might encounter, though there *are* several of these gases that we do commonly encounter. The use of specialized gas detection equipment affords us the means to determine if such a harmful gas is present in an enclosed space and thus the proper use of this equipment ultimately makes our operations safer.

**GUIDELINE:**

**General**

1. The department currently uses MSA “ALTAIR 4X” multi-gas detectors for general atmospheric monitoring needs. The ALTAIR 4X measures/reads four different gases/levels - Oxygen, Carbon Monoxide, Hydrogen Sulphide, and Pentane (for Lower Explosive Limits and explosive atmosphere comparison). There will be different parameters for each of the gases/level readings.
2. The department also has a limited number of “single gas” detectors used for the investigation of incidents where the presence of Hydrogen Cyanide is suspected.
3. All personnel using any gas detection device shall be thoroughly trained in their operation and limitations.

Altair 4 X Training, <https://youtu.be/doJeln4RRaI>

Altair Pro HCN Single Gas Detector, <https://youtu.be/ALXBP82qVM>

4. When using any multi or single gas detector in an atmosphere that is oxygen deficient or is known to be/suspected to be/or may become contaminated, all staff shall wear full PPE and SCBA.

**Calibration, Testing and Sensor Replacement**

5. The Deputy Fire Chief is responsible for all aspects of gas detector and calibration station acquisition, repair and maintenance including calibration, periodic maintenance testing, sensor changes, calibration gas replenishment and the maintenance of all records associated to these devices.
6. All firefighters who use the MSA ALTAIR 4X or PRO gas detection equipment are required to properly bump test the detectors *Weekly*.

NOTE: Each MSA ALTAIR detector has its own calibration gas and these cannot be interchanged.

7. Where any gas detector fails a bump/calibration test or is in need of repair (i.e. – sensor replacement), it shall be taken out of service and the Deputy Fire Chief shall be notified via email. The detector shall then be sent to a qualified MSA service provider for repair.

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### **Operations – Multi-Gas Detectors**

8. Upon arriving on scene, firefighters are to turn “on” the detector outside of the apparatus in clean air and “zero out” the detector. Gas detectors should not be turned on near the apparatus as diesel fumes can distort the zero level readings. The detector will take approximately 60 seconds to do a self-check and become ready for use.

#### **Multi-Gas Detectors - Oxygen Reading**

9. Oxygen readings are to be reported to “Command” in any instance where the ALTAIR 4X is being used. Command will be alerted if the readings go into the alarm stage for either too little O<sub>2</sub> (below 19.5) or too rich (above 21%). It should be noted that decreases of 1%, or more, in the O<sub>2</sub> percentage level may indicate the presence of another gas displacing the oxygen. Oxygen deficient atmospheres may cause combustible gas readings to be lower than actual concentrations. Oxygen enriched atmospheres may cause combustible gas readings to be higher than actual concentrations.

#### **Multi-Gas Detectors - Hydrogen Sulphide (H<sub>2</sub>S)**

13. Command will also be notified if there are any readings for the presence of H<sub>2</sub>S. If the detector goes into alarm the firefighters will exit the building and determine the next course of action.

#### **Multi-Gas Detectors - Lower Explosive Limit (LEL)**

14. Firefighters will monitor the LEL (combustible explosive) percentages during all CO calls, Natural Gas/Propane leaks or other unknown odour alarms. Upon reading any change in the LEL (any readings above 0 percent) percentage the firefighters are to notify command immediately and then exit the building. Generally, the source of the flammable fuel will be determined and shut down/controlled if possible. The building will then be ventilated and the firefighters will re-enter to check the gas readings. All sources of ignition will be controlled while there is any sign of flammable gas present.

NOTE: a reading of “XXX” on this detector indicates that you are in an atmosphere that is 100% of the LEL representing a very dangerous condition – exit immediately.

#### **Multi-Gas and Single Gas Detectors - Carbon Monoxide**

15. Command will be notified of the CO level on each level of a building being investigated as well as the levels in the furnace/hot water tank/natural gas installation area. If the detector goes into alarm the firefighters will exit the building and turn off the incoming fuel supply. (The detector - in full alarm - is not to remain inside for excessive amounts of time or else the sensor can be damaged. The firefighters may return to the building to ventilate after consulting with command.)

#### **Termination of Operations**

16. Upon termination of the incident, any detector used will be checked for proper operation, cleanliness, battery life and be bump tested if necessary.

17. Should any unit fail both the bump and calibration test, or if it becomes damaged, the Deputy Fire Chief is to be notified and the detector is removed from service for repair.

#### **Use of Single Gas Detectors – Hydrogen Cyanide**

20. The MSA ALTAIR PRO is used to detect the presence of Hydrogen Cyanide in a post-fire investigation and it is particularly helpful in assessing interior atmospheric conditions following kitchen fires etc. The presence of both CO and HCN in a post-fire situation is

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especially problematic from a health perspective, and the use of SCBA during post-fire overhaul is highly encouraged.

21. The MSA ALTAIR PRO will be bump tested weekly. The bump test form will be filled out on the equipment maintenance sheet for the appropriate unit. If the unit fails the bump test, it will be taken out of service immediately.

**Documentation**

22. The Operations Division will be responsible for maintaining all records of service and testing of all detection equipment including bump tests. Where this information relates to the multi-gas detection equipment and is logged automatically by the GALAXY G2 automated test station, the Technical Maintenance Division shall be responsible for downloading/transferring this information to the accepted departmental format on a minimum bi-annual basis.

**RESPONSIBILITY:**

It is the responsibility of all Emergency Operations Division staff to comply with the provisions of this Operating Guideline.

**REFERENCES:**

- MSA Instruction Manual & Training Materials