# Purpose

This procedure describes the acceptable level of functionality, alarm points and testing requirements for portable and personal gas detectors.

# Scope

This standard applies to all assets and premises owned, leased or occupied by Melbourne Water employees and contractors.

Contractors can use other branded detectors as long as they comply with all sections of this document excluding all parts of Section 1.

# Procedure

# Gas Detector Models

The Melbourne Water Standard comprises of the following Gas Detector Models:

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| --- | --- | --- | --- |
| Single Gas Detector | | | |
| **Gas** | **Brand** | **Model** | **Part No.** |
| Chlorine | Draeger | Pac 7000 CL2 | 83 18 978 |
| Ammonia | Draeger | Pac 7000 NH3 | 83 18 9794 |

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| **Multi Gas Detector – Confined Space Entry** | | | |
| **Gas** | **Brand** | **Model** | **Part No.** |
| % LEL | Draeger | X-am 2500 | 35 03 959 |
| Oxygen |
| Hydrogen Sulphide |
| Carbon Monoxide |

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| **Multi Gas Detector – Ozone/Chlorine Work** | | | |
| **Gas** | **Brand** | **Model** | **Part No.** |
| Ozone | Draeger | X-am 5000 | 350947 |
| Chlorine |
| Oxygen |

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| **Multi Gas Detector – Intrusive Ozone Generator Work** | | | |
| **Gas** | **Brand** | **Model** | **Part No.** |
| Ozone | Draeger | X-am 5000 | 3503970 |
| Nitrogen Dioxide |
| Oxygen |

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| **Multi Gas Detector – Sewer Access** | | | |
| **Gas** | **Brand** | **Model** | **Part No.** |
| % LEL | Draeger | X-am 8000 | TBA |
| Oxygen |
| Hydrogen Sulphide |
| Carbon Monoxide |
| Ammonia |
| VOC |

# Alarm Points

All portable and personal gas detectors must comply with the following alarm points:

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| --- | --- | --- | --- | --- | --- |
| **Gas** | **Low Level Alarm** | **High Level Alarm** | **TWA** | **STEL** | **Shift Length** |
| Chlorine | 1.0ppm | 2.0ppm | 1.0ppm | 1.0ppm | 8 hours |
| Ammonia | 25ppm | 50ppm | 25ppm | 35ppm | 8 hours |
| Ozone | 0.1ppm | 0.3ppm | 0.1ppm | 0.1ppm | 8 hours |
| Oxygen | 19.5 Vol% | 23.5 Vol% | N/A | N/A | N/A |
| % LEL | 5% | 10% | N/A | N/A | N/A |
| Hydrogen Sulphide | 10ppm | 20ppm | 10ppm | 15ppm | 8 hours |
| Nitrogen Dioxide | 3ppm | 6ppm | 3ppm | 5ppm | 8 hours |
| VOC | 10ppm | 20ppm | N/A | N/A | N/A |

For alarm settings of any gases not listed above, refer to: [‘Safe Work Australia: Workplace Exposure Standards for Airborne Contaminants’](#_References)

When a compatible Draeger Gas Detector is placed into a Melbourne Water X-Dock Bump Tester, the above settings will automatically be uploaded to the Gas Detector. This includes detectors that have not been purchased by Melbourne Water.

# Calibration

All portable and personal gas detectors must be calibrated every six months as a minimum. It is preferred that this test is carried out by a third party; however a person who is competent in the calibration procedure may carry out this test.

After calibration, a documented record of the calibration must be retained in Maximo against the asset, and the detector must have a legible sticker showing the last date that the calibration was carried out.

# Functionality

All portable and personal gas detectors must:

* have audible, visual and vibration alarms activated
* ensure the current gas readings are visible on a digital display
* ensure the battery can last at least eight hours before requiring a recharge

# Bump testing

## Overview

*“Some gases or vapours can cause corrosion or other deterioration to certain types of sensors. Some types of sensors have specific lifetimes. The sensitivity can change over time. This applies to certain types of sensors for toxic gases and oxygen deficiency as well as for flammable gases and vapours. This is the major reason for requiring frequent functional checks [Bump Testing] of some of the more common types of flammable gas detectors.”*

*AS 60079.29.2:2016 Section 4.1.1*

## Daily Bump Testing

Bump testing of personal and portable gas detectors should be carried out on the day of each use. It is recommended that it be carried out by the actual person who will be operating the equipment.

A Bump Test includes the following mandatory checks:

* Checking that the battery is adequately charged
* Verifying that Vibration, Audible and Visual Alarms activate correctly
* Ensuring the detector warms up successfully and enters a normal operating mode with no alarms
* Zero Checking – Ensuring that a Zero reading is displayed once the unit has warmed up in fresh air
* Complete a Bump Check with appropriate calibration gas and dock

## Bump Testing Equipment

To ensure that the Bump Test has been carried out successfully the following items will be required:

* Calibration Gas Cylinder that will ensure that all gases within the detectors normal function will be tested
* A flow restrictor to maintain a flow of gas as determined by the manufacturer
* Fittings required to connect the calibration gas to the detector
* A book to maintain the records of the detector testing. Left at the Bump Tester.
* Instructions on how to complete the Bump Test for the Gas Detector

The test equipment needs to be maintained by trained personnel on a 12 monthly basis.

## Bump Test Locations

Automated ‘Bump Test’ stations [Draeger X-Dock] are located at all major operational sites.

Portable ‘Bump Test’ stations are available for booking out from various Melbourne Water and Wood stores.

## Documentation

Once all the above tests have been carried out on the gas detector, the results must be documented in a ‘Gas Detector Bump Test’ register which is to be kept with each testing device/calibration gas cylinder.

The documented entry must include the following information:

* Gas Detector Identification Number
* Tester’s Name
* Test Date
* Signature
* Result of test. Pass/Fail

A detector that fails any of the mandatory tests must be tagged as ‘out of service’ and a supervisor shall be notified.

# Training and Awareness

All individuals who are required to use portable and personal gas detectors should be made familiar with the requirement of daily Bump Testing and trained on how to complete the tests by a designated site representative at the relevant site. Formal training for this procedure is not required.

This procedure should be reviewed in Team Safety Management Plans refer (CORP H&S 006 – Health and Safety Management Plans) on an annual basis.

# Responsibilities

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| Role | Responsibility |
| Individual | * Perform the mandatory gas detector functional checks as described in this procedure every day before work is carried out * Record the results of the test in the ‘Gas Detector Functional Check’ register * Report any defects or failures to your supervisor and tag device out of service |
| Managers/Team Leaders | * Ensure that all new staff are trained in accordance with this procedure * Ensure that the equipment to carry out testing is made available to all employees * Ensure any testing equipment is calibrated and records maintained * Ensure that the register is maintained * Ensure Safety Management Plans have an annual review of this procedure * Ensure all works are undertaken by contractors in compliance with this procedure |

# Definitions

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| --- | --- |
| Reference | Definition |
| Bump Test | A brief exposure of the detector to gas in order to verify that the sensors respond and the instrument alarms function accordingly. |
| Draeger | A gas detector manufacturing company |
| X-Dock | Draeger branded Bump Testing unit used by Melbourne Water |
| Functional Check | A method of obtaining a response from the sensor to check its function. |

# References

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| Links |
| [Safe Work Australia: Workplace Exposure Standards for Airborne Contaminants’](https://www.safeworkaustralia.gov.au/doc/workplace-exposure-standards-airborne-contaminants) |
| AS/NZS 60079.29.2:2016 - Part 29.2: Gas detectors—Selection, installation, use and maintenance of detectors for flammable gases and oxygen |
| AS/NZS 60079.29.1:2008 - Part 29.2: Gas detectors—Selection, installation, use and maintenance of detectors for flammable gases and oxygen |

# Document History

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| --- | --- | --- | --- |
| Date | Reviewed/  Actioned By | Version | Action |
| March 2020 | Safety Manager, Technology and Innovation | 7 | Format change only. |
| August 2024 | SHEQ Safety Advisor | 8 | Scope updated for contractors to reference 1 not section 2. |