Calibration, Operation & Maintenance of Portable Direct Reading Instruments

Overview

Purpose

The purpose of this Standing Instruction is to establish procedures for the proper operation, calibration, and maintenance of atmospheric monitoring equipment at the Los Angeles Refinery.

Scope

The scope of this standard addresses calibration, operation and maintenance of atmospheric monitoring equipment used by operation and maintenance personnel within the Marathon Los Angeles Refinery Carson and Wilmington Operations, Calciner, Watson Cogen Facility, and the Sulfur Recovery Plant (SRP).
Note: These instructions reflect information found in the equipment's operating manual(s).

Records Retention

Printed copies of this document should not be retained more than 12 months. Any revision to this document will be retained a maximum of 10 years following the revision.

Table of Contents

1.0 References

1.1 Refining References

The table below lists the Refining references used with this document.

Number	Description
HSS-201	Safe Work Permit
HSS-205	Safe Entry into Inert Atmosphere Overview
HSS-215	Confined Space
HSS-630	Hot Work

1.2 Industry References

The table below lists the industry references used with this document.

Number	Description
MX-6 IBRID	Multi Gas Monitor Operation Guide
MX-4 Ventis	Product Manual

1.3 Regulatory References

The table below lists the regulatory references used with this document.

Number	Description
Title 8, CCR, 6189.	Petroleum Safety Orders, Gases and Vapor Testing

1.4 Terms

The following terms are used in this document:
Reference: For details, see Appendix A: Terms and Definitions.

2.0 Roles and Responsibilities

2.1 Roles and Responsibilities

The table below describes the roles and responsibilities related to this document.

Roles	Responsibilities
Operations	Gas testing for the issuance of safe work permits. Possess a basic working knowledge of how portable direct read instrument's function.
Maintenance	Continuous gas monitoring when required by the safe work permit process. Possess a basic working knowledge of how portable direct read instrument's function.
HES Professionals	Provide guidance to Operations and Maintenance in the operation, calibration, and maintenance of portable direct reading instruments.
Safety Issue	Calibration, maintenance, and issuance of portable direct reading instruments.

3.0 General

3.1 General Requirements

Multi gas detectors shall be “bump tested” each shift prior to being used and calibrated monthly.

All instruments will automatically bump test daily and calibrate monthly when docked on the DS2 docking station. Each instrument must be docked prior to being used.

Gas testing devices are issued at Carson and Wilmington Safety Issue. At the Calciner the instruments are managed by Safety and Operations. Instruments are bump tested and calibrated and appropriate logs maintained.

Contractors can provide their own instruments with pre-approval from the Safety Department. Contract companies must have a written program and provide bump test and calibration logs monthly to the Safety Department. Contractor programs must meet or exceed Marathon’s policy.

4.0 IBrid MX6

4.1 General

LAR operating units are issued the IBrid MX6. It is a multi-gas instrument that may be configured to monitor percent LEL, percent oxygen, carbon monoxide, hydrogen sulfide, Photo Ionization Detector (PID)
Note: Some instruments have a 6th sensor for sulfur dioxide (SO2) at the Sulfur, Calciner, and Alky Units. Other instruments also have additional sensors for hydrogen (H2) and nitrogen (N2) at the Hydro Processing Departments and that HES Professionals utilize.
These instruments provide audible and visual signals, gases are detected at set concentrations.

In addition to the process areas, Safety Issue at Wilmington and at Carson has an inventory of MX6 instruments that are available for issue for continuous gas monitoring.

4.2 Operation

To turn on the instrument

- Press the center navigation button for two seconds
- After the warm-up sequence has been completed the instrument will prompt you to test the pump by covering the end of the tubing. After this step is complete the MX6 will enter the real time operating mode.

To turn off the instrument

- Press the center navigation button for two seconds

4.3 Maintenance

iNet will automatically notify the Safety Department and the Carson/Wilmington Safety Issue upon failure of calibration, low calibration gas or when services are needed.

4.4 Sampling Requirements

LEL sensors must have a minimum of 10% oxygen by volume in the air to read accurately. In conditions of low oxygen an IR/Inert Meter can be used to accurately take gas monitoring readings. These meters are available by contacting a HES Professional.

4.5 Cross Sensitivities

Cross sensitivity is when another gas or contaminant is causing the sensor to read incorrectly. They occur because of the limitations of the sensors and instruments. We should be aware of the environment we are gas testing and use a different instrument if two gases are present that will interfere with each other.

Note: Contact Health & Safety Dept for guidance on cross sensitivity issues.

5.0 Ventis MX 4

5.1 General

The Ventis MX4 is a multi-gas instrument that is configured to monitor a percentage of LEL, At Carson and the Calciner. Ventis MX4's is used to monitor for LEL on attended hot work jobs.

Note: MX4s are NOT to be used for initial gas tests. They are only to be used as a continuous gas monitor.

Additionally, the Analyzer Department has an inventory of these meters that are configured to read H2S, O2, and LEL.

Carson Safety Issue has an inventory of MX4 instruments with LEL sensors that are available for issue. At the Calciner these instruments may be obtained thru Operations or thru the Safety Department.

5.2 Operation

- Turn the instrument on by pressing and holding the button on the left-hand side for 3 seconds and the operating screen appears.
- Check the battery status. The battery symbol is located on the left side of the screen. A completely shaded battery indicates 100% charge. As the battery becomes un-shaded, this indicates how much battery life is left.
- There will be a status indicator in the top left-hand corner. If a √ - mark appears, the status is good, and the monitor is ready for use. If you see an !, then, something has failed, and the meter must be switched out
- If the instrument alarms while continuously monitoring. The job shall be stopped, and proper notifications shall be made.

5.3 Maintenance

If the instrument is inoperable, return to Safety Issue or to the Safety Department.

6.0 Gas Sampling Pumps and Detector Tubes

6.1 Purpose

Detector tubes are one of the most useful and fastest ways to sample air. The system consists of a hand held bellows pump (Draeger Accuro or MSA Kwik-Draw) or a piston pump (Gastec) and a single-use colorimetric gas detection tube (Draeger, MSA, or Gastec). The detector tubes contain a chemical reagent that will change color in direct correlation to the concentration of a specific gas present.

6.2 Accuracy

Detector tubes are good indicators of specific contaminants and their accuracy is within the industry norm of ±25%.
Note: When applicable, utilize a multi-gas direct-read instrument to monitor air concentrations.

CAUTION: Always test the pump for leaks before use to ensure proper sample measurement. Only use same name brand equipment; DO NOT interchange products.

6.3 Leak Test

Always test the pump for leaks before use to ensure proper sample measurement.

Leak Test. Insert an unopened detector tube and squeeze the pump completely. After releasing, the bellows should remain completely compressed for one minute.

Suction Test. Squeeze the pump completely. After releasing, the pump must open instantly and fully.

If the unit should fail either of these steps do not use the instrument. Turn the unit in to a HES Professional.

7.0 DS2 Docking Station, INet, Calibrations, and Bump Testing

7.1 General

When the Industrial Scientific MX6 is docked on the DS2 docking station it will automatically perform:

- Daily bump testing and monthly calibrations at pre-set times
- Logging of the bump tests or calibrations which are maintained online in iNet
- A diagnostic test
- A download of any alarms and history to iNet

Note: It is important that the instruments are docked at least daily when they are going to be used in the field. Upon docking, the bump test and/or calibration will occur automatically. Only use a demand flow regulator and Industrial Scientific gas for calibration and bump tests.

Note: The DS2 Docking Station will automatically notify the Safety Department when a calibration fails, calibration gas is low, or service is needed.

8.0 Supply Information

8.1 General

All supplies and equipment can be obtained through Safety Issue at Carson, & Wilmington, and the Safety Department at the Calciner.

Appendix A: Terms and Definitions

A.1 Bump Test	Brief exposure of the monitor to a known concentration of gas(es) for verifying sensor and alarm operation. It is not intended to be a measure of the accuracy of the instrument.
A.2 Calibration	Refers to full factory recommended calibration where the monitor is exposed to gas(es) at known and certified concentrations and the monitor response is spanned against the known concentration.
A.3 Cross Sensitivity	The response of a sensor to a gas that is not the target of the sensor.
A.4 Accuracy	Degree of closeness of a measured or calculated quantity to its actual (true) value
A.5 Sensor	A device which detects or measures a physical property and records, indicates, or otherwise responds to it.
A.6 Calibration Gas	A calibration gas is a reference gas or gas mixture used as comparative standard in the calibration of analytical instruments, like gas analyzers or gas detectors. Therefore, a calibration gas has to be of a precisely defined nature or composition, like zero gas or span gas, for example 500 ppm carbon monoxide in nitrogen.
A.7 MX 4	Gas testing instrument used to detect up to four gases.
A.8 MX6	Gas testing instrument used to detect up to six gases.
A.9 Peak Readings	The instrument stores the highest detected gas readings. Which is the highest concentration of the gas that was detected at any given moment.

Revision History

Document Revision History

Complete the following table for each document revision.

Rev. No.	Description of Change	Author	Approved By	Rev. Date	Effective Date
1	Updated Marathon Information and updated to Marathon Template.	Jennifer Bolls	Connie Lema	2.25.2022	03.09.2022