



**LOS ANGELES REFINERY  
HEALTH & SAFETY  
STANDING INSTRUCTION**

**HSS-301**

**Calibration, Operation & Maintenance of Portable  
Direct Reading Instruments**

Page 1 of 8

ISSUE DATE:  
3/11/19

Rev:  
1

## Contents

<b>1.0 Introduction</b> .....	<b>2</b>	5.4 Maintenance .....	6
1.1 Purpose .....	2	5.5 Sampling Requirements .....	6
1.2 Scope .....	2	5.6 Cross Sensitivities .....	6
<b>2.0 References</b> .....	<b>2</b>	<b>6.0 Industrial Scientific MX4</b> .....	<b>6</b>
2.1 Tesoro Standards .....	2	6.1 General .....	6
<b>3.0 Definitions</b> .....	<b>3</b>	6.2 Operation .....	7
<b>4.0 General Requirements</b> .....	<b>3</b>	6.3 Maintenance .....	7
4.1 DS2 Docking Station, iNet, Calibrations and Bump Testing .....	4	<b>7.0 Gas Sampling Pumps and Detector Tubes</b> .....	<b>7</b>
<b>5.0 Industrial Scientific MX6</b> .....	<b>5</b>	7.1 Purpose .....	7
5.1 General .....	5	7.2 Accuracy .....	7
5.2 Operation .....	5	7.3 Leak Test .....	8
5.3 Documenting Results to a Permit .....	5	<b>8.0 Supply Information</b> .....	<b>8</b>

<b>Revision:</b>	<b>Prepared by:</b>	<b>Approved by:</b>	<b>Date:</b>
0	Amy Sen	P & P	3/11/19
<b>NOTICE:</b> The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.			
CBU-REF-HAS-LAR-300-00001			Page 1 of 8



## 1.0 INTRODUCTION

---

### 1.1 Purpose

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

Note: this Standing Instruction meets the requirements set forth in Title 8, California Code of Regulation's Petroleum Safety Orders, Section 6789 - Gases and Vapor Testing.

### 1.2 Scope

This instruction addresses calibration, operation and maintenance of atmospheric monitoring equipment used by operation and maintenance personnel within the Tesoro 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). Further information on each instrument can be obtained from the manufacturer's operating manual that is available from the H&S Department

## 2.0 REFERENCES

---

The following Tesoro Standing Instructions were either reviewed during the writing of this instruction or must be reviewed for compliance.

### 2.1 Tesoro Standards

- HSS 201 Permit to Work System

<b>Revision:</b>	<b>Prepared by:</b>	<b>Approved by:</b>	<b>Date:</b>
0	Amy Sen	P & P	3/11/19
<b>NOTICE:</b> The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.			
CBU-REF-HAS-LAR-300-00001			Page 2 of 8



### 3.0 DEFINITIONS

The following additional definitions are applicable to this Standing Instruction.

Term	Description
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.
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.
Cross Sensitivity	The response of a sensor to a gas that is not the target of the sensor.
Accuracy	Degree of closeness of a measured or calculated quantity to its actual (true) value
Sensor	a device which detects or measures a physical property and records, indicates, or otherwise responds to it.
Calibration Gas	A <b>calibration gas</b> is a reference gas or gas mixture used as comparative standard in the calibration of analytical instruments, like <a href="#">gas analyzers</a> or <a href="#">gas detectors</a> . Therefore, a calibration gas has to be of a precisely defined nature or composition, like <a href="#">zero gas</a> or <a href="#">span gas</a> , for example 500 ppm carbon monoxide in nitrogen.
MX6	Gas testing instrument used to detect up to six gases.
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.

### 4.0 GENERAL REQUIREMENTS

The following are general requirements for use of portable reading instruments.

- The following is the Gas Testing Summary (Refer to HSS-201 Permit to Work):

<b>Revision:</b>	<b>Prepared by:</b>	<b>Approved by:</b>	<b>Date:</b>
0	Amy Sen	P & P	3/11/19
<b>NOTICE:</b> The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.			
CBU-REF-HAS-LAR-300-00001			Page 3 of 8



	<b>Task / Equipment</b>	<b>Minimum Authorization Requirements</b>	<b>Gas Testing Requirements</b>
<b>INSIDE Process Unit / Tank Basin</b>	Vehicle Entry, Light Plants, Portable Compressors, Portable Engines	Vehicle Entry Authorization	Initial Gas Test
	Low Energy Hot: Not Cutting or Drilling into Process Piping	Low Risk - Low Energy Hot Permit and JHA	Initial Gas Test <b>or</b> Continuous LEL Alarm
	Low Energy Hot: Cutting or Drilling into Process Piping	Low Risk - Low Energy Hot Permit and JHA	Initial Gas Test
	High Energy Hot Work	Medium Risk - High Energy Hot Permit, JHA, and MRA	Initial Gas Test <b>and</b> Continuous LEL Alarm
<b>OUTSIDE Process Unit / Tank Basin or inside pressurized building</b>	Low Energy Hot	Low Risk - Low Energy Hot Permit and JHA	None
	High Energy Hot Work	Medium Risk - High Energy Hot Permit, JHA, and MRA	Initial Gas Test <b>and</b> Continuous LEL Alarm
<b>Confined Space Entry</b>	Confined Space Entry	Medium Risk - Confined Space Entry Permit, JHA, and MRA	Initial Gas Test <b>and</b> Continuous Multi-Gas Meter

- 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 the Wilmington Tool Room and Carson 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.

**4.1 DS2 Docking Station, iNet, Calibrations and Bump Testing**

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.

<b>Revision:</b>	<b>Prepared by:</b>	<b>Approved by:</b>	<b>Date:</b>
0	Amy Sen	P & P	3/11/19
<b>NOTICE:</b> The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.			
CBU-REF-HAS-LAR-300-00001			Page 4 of 8



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.

## 5.0 INDUSTRIAL SCIENTIFIC MX6

### 5.1 General

LAR operating units are issued the Industrial Scientific iBrid MX6. It is a multi-gas instrument that may be configured to monitor percent LEL, percent oxygen, carbon monoxide and hydrogen sulfide

Note: Some instruments have a 5th sensor for sulfur dioxide (SO<sub>2</sub>) at the SRP and Calciner. These instruments also have additional sensors for hydrogen (H<sub>2</sub>) and nitrogen (N<sub>2</sub>) that Safety Representatives and Operations utilize to perform initial gas testing.

These instruments provide audible and visual signals gases are detected at set concentrations.

In addition to the process areas, the Tool Room at LAR-Wilmington and Safety Issue at LAR-Carson has an inventory of MX6 instruments that are available for issue. Any concerns or issues with these instruments should be directed to the Safety Department.

### 5.2 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 zero the sensors, follow the prompt.
- If the meter does not prompt you to zero the sensor, press the center navigation button once and scroll to the right to SENSOR to access the zero function. Scroll down to Zero All and press the center navigation button to start Zeroing function.

(Ensure you are in a clean air environment anytime you zero the sensors!)

- The instrument will than 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

### 5.3 Documenting Results to a Permit

When performing an initial gas test or required gas test. Enter the following on to the permit in Gas Tests section

- Instrument number
- LEL result

<b>Revision:</b>	<b>Prepared by:</b>	<b>Approved by:</b>	<b>Date:</b>
0	Amy Sen	P & P	3/11/19
<b>NOTICE:</b> The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.			
CBU-REF-HAS-LAR-300-00001			Page 5 of 8



- O2 result
- Toxic gas results
- The time and signature of the gas tester

5.4 Maintenance

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

5.5 Sampling Requirements

LEL sensors must have a minimum of 10% oxygen by volume in the air to read accurately. In conditions of low oxygen a dilution tube must be used. This tube would draw a 1:1 ratio of ambient oxygen with the gas being drawn. When using the dilution tube, there are certain criteria to follow:

- Check ambient oxygen reading, must be between 19.5%-23.5%
- Maximum sampling length of 10 feet

If the instrument alarms while performing a gas test or while continuously monitoring, the job shall not be permitted; or if the job is in progress, the space shall be stopped, and proper notifications shall be made.

Sensor	Cal Gas Concentration	Monitor Readout Concentration
CO	100 ppm	90-110 ppm
H <sub>2</sub> S	25 ppm	22-28 ppm
SO <sub>2</sub>	10 ppm	9 – 11 ppm
O <sub>2</sub>	19.0%	18.5-19.5%
LEL	25%	22-28%

5.6 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 Safety Dept for guidance on cross sensitivity issues.

6.0 INDUSTRIAL SCIENTIFIC MX4

6.1 General

The Ventis MX4 is a multi gas instrument that is configured to monitor a percentage of LEL, At Carson and the Calciner. Industrial Scientific MX4's is used to monitor for LEL Only on all high energy hot work jobs and on some low energy 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.

Revision:	Prepared by:	Approved by:	Date:
0	Amy Sen	P & P	3/11/19

NOTICE: The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.



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. Any concerns or issues with these instruments should be directed to the Safety Department.

### 6.2 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 unshaded, 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.

To zero the sensors:

- **Ensure you are in a clean air environment.**
- Press the power button 3 to 4 times until the display shows a 0 with a line thru it. Then press the right-direction button. This will activate the zeroing of the meter.

**Zeroing of the MX4 sensors will only occur at Carson Safety Issue or by the Safety Department at the Calciner. The zeroing of the sensors will occur while on the docking station and should never be performed while in the field.**

### 6.3 Maintenance

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

## 7.0 GAS SAMPLING PUMPS AND DETECTOR TUBES

### 7.1 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.

### 7.2 Accuracy

Detector tubes are good indicators of specific contaminants and their accuracy is within the industry norm of ±25%.

<b>Revision:</b>	<b>Prepared by:</b>	<b>Approved by:</b>	<b>Date:</b>
0	Amy Sen	P & P	3/11/19

**NOTICE:** The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.



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.

### 7.3 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 the Health and Safety Coordinator.

## 8.0 SUPPLY INFORMATION

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

## 9.0 REVISION TABLE

Revision Date	Summary of Changes	Custodian	Authority
03/11/2019	Added new words for definitions Added table for Gas Testing Summary	Amy Sen	Connie Lema

Revision:	Prepared by:	Approved by:	Date:
0	Amy Sen	P & P	3/11/19

**NOTICE:** The information contained herein is the confidential property of Tesoro Refining & Marketing Company unless another source is indicated. This material is subject to return on demand and must not be disclosed or reproduced without prior written consent by a duly authorized representative of Tesoro Refining & Marketing Company.