

Guidance for Monthly Vapor Monitoring for Leak Detection

MDEQ – UST Division

The following guidance is being provided as a reminder to ensure proper procedure, equipment, and calibration of vapor meters used for UST leak detection in Mississippi. The majority of vapor meters used in MS are catalytic devices (RKI Eagles) calibrated to Hexane, or Photoionization devices (PID meters) calibrated to Isobutylene.

- 1.) Vapor readings should be obtained from the lowest point in the well. This usually requires a 10 to 16 foot long probe or sampling tube to be able to reach the bottom of the well. Taking readings near the top of the well is NOT sufficient. (Note: It is beneficial to take vapor readings near the top of the well to discover leaky spill buckets or piping / STPs quickly, but these readings do NOT assist in catching a leaking UST quickly. Top readings should NOT be recorded on the MDEQ form without specifying which readings were taken from the bottom or the top.)
- 2.) For vapor meters using catalytic sensors, the meter should be calibrated to either:
 - a. Hexane only. A dilution fitting should be attached to the 16 foot probe. The dilution fitting ensures an adequate blend of Oxygen is pulled into the meter. Catalytic sensors must have Oxygen to burn the sample. Without the dilution fitting, your reading will be significantly OFF.
 - b. Hexane and Oxygen. (Note: Oxygen sensor is more commonly used for tank removals.) If your meter is programmed for both, you do NOT have to use the dilution fitting, however you have to watch the % Oxygen on the meter when you obtain a reading. 11% or higher Oxygen is required for the catalytic sensor to work properly. (Ex. If the Oxygen level at the bottom of the well is 8%, your ppm Hexane reading will be significantly off.) It is much easier to use the dilution fitting for all cases. The dilution fitting ensures adequate Oxygen regardless of the amount of Oxygen at the bottom of the well.
 - c. NO other gasses should be programmed into the vapor meter (without prior approval from MDEQ). Methane specifically is NOT approved. Your vapor meter should be equipped with a Methane elimination switch to avoid bad readings. (RKI Eagles 1 and 2 have this)

- 3.) Dilution fittings. Should be 1:1 ratio. When using a dilution fitting, you ALWAYS double your ppm Hexane reading. (Ex. You record 5,000 ppm Hexane. Double that to 10,000 ppm when you report reading on the MDEQ form. Note: Vapor readings reported on MDEQ form should not exceed 11,000 ppm (11% Lower explosive limit). PID devices typically do not require Oxygen (dilution fitting) to get a ppm reading, so there is nothing to double with a PID reading. No dilution fitting should be used with a PID device.

- 4.) Calibration gas (bottles) for catalytic sensors should contain ONLY Hexane. Usually this is indicated as 14-16% Hexane concentration on the bottle. If your bottle is mixed with several other gasses there may be an issue that would affect calibration of the meter.



- 5.) Vapor readings should be recorded in ppm Hexane for each well. If your device is a PID, it likely is calibrated to Isobutylene, which is not common. Check with the PID vapor meter manufacturer to get the right conversion factor to convert the ppm Isobutylene to ppm Hexane, for reporting on the MDEQ form.
- 6.) Calibration of your vapor meter is required at a minimum monthly AND after checking hot wells (11,000 ppm Hexane). Bump testing is sufficient to confirm calibration monthly. Adjust vapor meter settings as needed per the manufacturer's instructions. During bump testing, your ppm Hexane reading should increase quickly. If it takes 10-15 minutes to reach the concentration on the bottle of calibration gas, then your catalytic sensor is bad and should be replaced.
- 7.) The orifice on dilution fittings can get stopped up. If you suspect this, you should test your dilution fitting during bump testing. Bump test your vapor meter as you normally would. Ensure that it is within +/- 1 % LEL of the concentration written on the bottle used for calibration. Once adequate calibration is confirmed, insert the dilution fitting in-line between the bottle and the vapor meter. The dilution fitting should effectively cut your % LEL reading in half. (Ex. If calibration bottle is 16% LEL Hexane with the dilution fitting inserted in the line, you should only be able to measure approximately 8% LEL Hexane. If the vapor meter is showing approximately half the concentration in the bottle, your dilution fitting is functioning properly.) Note: If the dilution fitting is 1:1 ratio it should produce half the concentration of the bottle. Other dilution fittings are available in different ratios. It is important to know what you have to ensure accurate readings.
- 8.) All vapor meters used in MS are required to be calibrated annually by a 3rd party by 10/5/2021 and every year thereafter. (See the Annual Handheld Release Detection Equipment Inspection form.)

Currently Approved Vapor Meters				
Manufacturer	Model	Sensor Type	Sensor Range ppm	Gas Calibrated to
Ion Science	ProCheck Tiger	PID*	0 – 10,000	Isobutylene
RKI	Eagle	Catalytic	0 – 11,000	Hexane
RKI	Eagle 2	Catalytic	0 – 11,000	Hexane
RKI	PID	IR*	0 – 2,000	Isobutylene
Comment: Issue with RKI Eagle 2 being used as PID meter due to range. Use catalytic sensor.				
RAE Systems	MiniRAE 3000	PID*	0 – 15,000	Isobutylene

* Conversion factors for PID – IR devices depends on lamp eV output and may vary by device, model, and manufacturers. Check with the manufacturer of your device to determine an accurate conversion factor.

Not Approved Vapor Meters	
Manufacturer	Model
Campo Miller	Any Model
RKI	GX-2012
RKI	GX-6000
Warrick	5700