

EPA Method 21 LDAR Sampling Using the NEO PID

Introduction

EPA Method 21 is a guideline for using VOC detectors for LDAR (Leak Detection and Repair) on chemical process equipment such as pipe joints, valves, flanges and pumps. Hundreds of potential leak locations may need to be tested and results recorded in one day. This Technical/Application Note describes the NEO PID compliance with Method 21 and it's unique firmware for rapid sampling, data storage, and data download.



NEO Compliance with EPA Method 21

The table below shows that the NEO EXT MP182 complies with all sampling detector requirements for a broad range of VOCs. The NEO PPM MP181 (0.01-5000 ppm) and NEO PPB MP184 (0.001-15,000 ppm) are also suitable in most cases.

NEO Compliance with EPA Method 21 Sampling Detector Requirements

Section	Method 21 Specification	NEO MP 182 PID Specification
6.1	Detects Compound	Measures most VOCs
6.2	Instrument Range covers leak definition (commonly 500 or 10,000 ppm)	0.01-15,000 ppm
6.3	Resolution $\pm 2.5\%$ of leak definition (typically >10 ppm resolution meets this need)	0.01 ppm for isobutylene
6.4	Pump flow rate 0.1-3.0 LPM	0.4 LPM
6.5	Probe Diameter $\leq 1/4"$ o.d.	$\leq 3/16"$ o.d.
6.6	Intrinsic Safety Class 1 Division 1	Class 1 Division 1
8.1.1	Response Factor available for compound	Over 700 Factors programmable
8.1.1.2	Response Factor <10	<10 for most compounds
8.1.2	Calibration Frequency Initial and every 3 mos.	Easy daily, weekly or monthly calibration
8.1.2.2	Calibration Precision $\pm 10\%$ of calibration gas concentration	$\pm 2\%$ of calibration gas conc.
8.1.3.2	Response Time $t_{90} \leq 30$ s	$t_{90} \leq 3$ s



- **Detects Most VOCs.** Many are ionizable with the standard 10.6 eV lamp and Response Factors for over 700 compounds are in the NEO instrument on-board library. Exceptions are some low-molecular weight compounds including methane and ethane.
- **Low Response Factors.** Most compounds have factors less than 10 when calibrated to isobutylene, and for those with higher factors, ethylene can be used to calibrate to reduce the response factor 10-fold.
- **Broad Range Covers Leak Definition and Precision.** Most leak definitions are either 500 or 10,000 ppm. The NEO range of 0.01 to 15,000 ppm easily covers these concentrations and the requirement for 2.5% of leak definition precision (2.5% of 500 ppm is 12.5 ppm).

Leak Definition Clarification

Method 21 does not define the threshold leak concentration that requires pipeline repair. Instead, this value is defined in other regulations specific to the industry and/or chemical of concern. There is a common misconception that the leak definition is always 10,000 ppm methane equivalents, because that example is given in Method 21. However the actual leak definition for many compounds is often lower, commonly 500 ppm, and is measured in ppm of the chemical of concern, not methane equivalents.

NEO Leak Detection and Repair (LDAR) Procedures

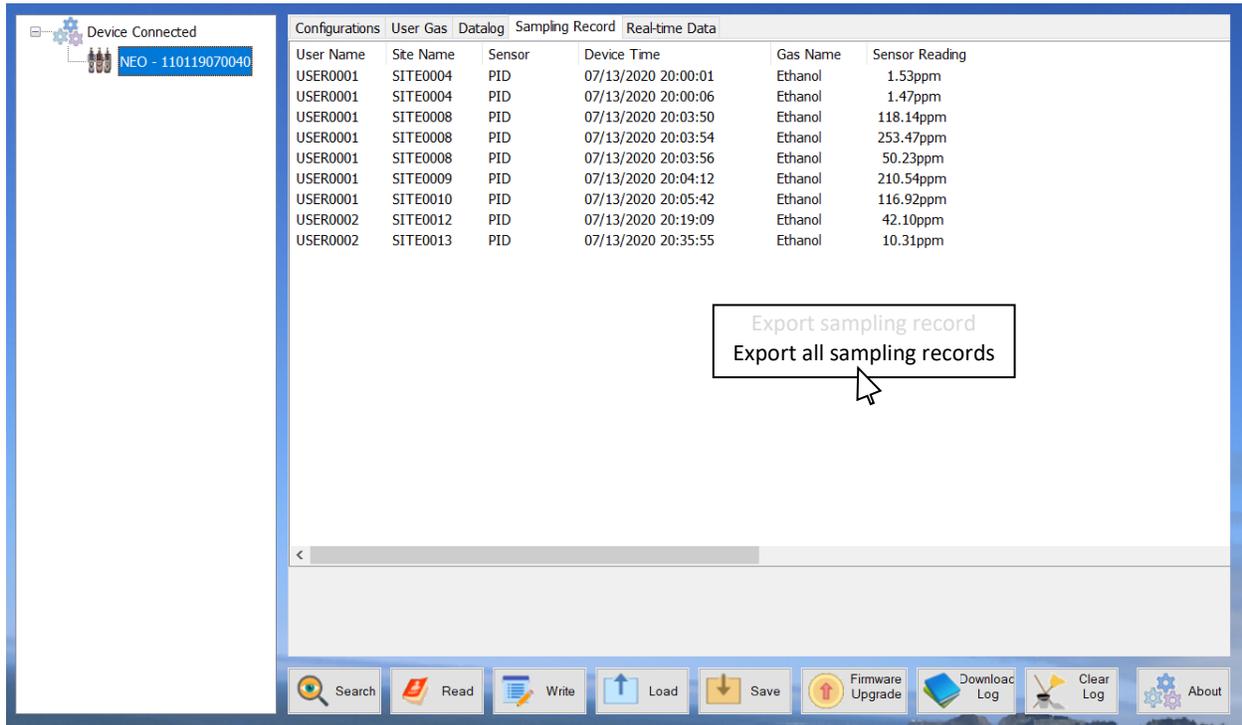
To measure a sampling point:

1. Enter the Configuration Mode, go to Monitor Set-Up and place the NEO in Search Mode (see User Manual for details).
2. Set the User ID and the first Site ID in the following two menus. Note that text can be entered for ease of local site and user identification. Exit to the main menu.
3. The display shows “Ready...Start Sampling? When at the desired sampling location, press the Right key to start the pump and initiate the sampling period.
4. When the maximum or otherwise desired reading is observed, press the Down key to record the sample concentration. If the reading is faulty or uncertain and a second measurement is desired during this sampling period, press the Down Key again, as many times as desired. Multiple readings per sample location/period can thus be recorded (see data download screenshot below).
5. When satisfied with the sampling reading(s), press the Right key, and the unit asks “Stop Sampling?” Press the Left key to return to the same sampling period or the Right key to end the sample.
6. The Site ID is automatically incremented by one the next time a sampling is initiated. Up to 9999 sites can be entered, after which the first site data get overwritten.
7. If the sampling period is ended without having pressed the Down key to record a reading, no information will be stored in the Sample Record (see Computer Interface below) but the Site ID will still be incremented when the next sampling is started.



LDAR Sampling Record Retrieval

To download the Sampling Records from the instrument to a PC, use the mPower Suite software, available on the mPower Website (<https://www.mpowerinc.com/software-downloads/>). Read the NEO User Manual for detailed procedures.



mPower Suite Sampling Record Screen

The sampling record files will appear under the “Sampling Record” tab on the top of the screen. Above is a sample screen of record information listing user name, site ID, sample time, gas name and sampled reading. A new Single Sampling Record is created each time the user starts sampling in Search Mode and presses the Down key. A new Site ID is assigned after the previous sampling is stopped and a new sampling is initiated. Each Site/Sampling Period can have multiple individual sample readings. Skipped Site IDs indicate that the Down key was not pressed during that sampling period and thus no Sample Record was created.

To export data to a csv file readable by Excel or other spreadsheet software, move the cursor over the right data panel and click the right mouse button, and then click on Export all Sampling Records.