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Refined-Oil in Water Handheld Fluorometer Kit

Background:

PAHs (Polycyclic Aromatic Hydrocarbons) are one of the most widespread organic pollutants. In addition to their presence in fossil fuels, they are also formed by incomplete combustion of carbon-containing fuels such as wood, coal, diesel, fat, tobacco, and incense. Due to their physical properties, PAHs are widely used in many industrial applications, such as lubricating oil, hydraulic oil, and electro-hydraulic control fluid. Their applications also could produce man-made contamination in the water systems due to leakage of the oils.

Fluorescence Detection:

The aromatic fraction of PAHs can be excited with UV or deep-UV light to emit fluorescent light. The fluorescence intensity is linear with the concentration of the oil. This technology is ideal for monitoring leaking lube oil in the cooling systems or power plants, or leaking oil in ocean/lake environment. Our handheld fluorometer is designed for refined oil and/or fuel detection and monitoring. Due to the low interference from other substances, we have proven that this technology can detect sub-mg/L (<1-ppm) level of refined oil/fuel contamination in water samples from the environment. And due to its high portability, it can be used anywhere in the field to conduct environmental inspection for potential oil contaminations.

Fluorometer Specifications:

- Uses proprietary quartz mini-tube for easy sample collection and high sensitivity.
- Rapid measuring (5 seconds reading) and user-friendly interface.
- Sensitive and wide measurement range. Typical minimum detection limit:
  1-5, naphthalenedisulfonic acid disodium salt (10 – 10,000ppb).
  5W30 Motor oil (1 – 1,000ppm). Gasoline (2 – 5,000ppm).
- Simple touch screen calibration. No repeated calibrations needed.
- Powered by 4xAA battery, or 5VDC power adaptor.
- Portable for field operation, and store up to 3x80 data points for computer analysis.

Field kit includes the following items:

- Handheld Fluorometer for Refined Oil
- Disposable 500-µL Transfer Pipette
- Re-useable Quartz Mini Tube

Simple Procedure:

1. Fluorometer calibration: Prepare standard solution of your target oil according to your preferred procedure and within the linear measurement range, and transfer 0.2mL into a quartz mini-tube as “Standard”. Transfer 0.2mL of dH2O (or solvent used in your oil extraction procedure) into another mini-tube as "Blank".
2. Switch on the fluorometer. Place the "Blank" tube into the sample holder. Close the cover. From the Main screen, press [Calibrate] → [Confirm] → [Assay 1] (or another assay number you like) → [Blank]. Fluorometer starts measuring. After the blank is measured, place the “Standard” tube into the sample holder and close the cover. Use the “<” and “>” arrow keys on the second row to move the underline to select the digit you want to change, and use the “+” or “- “ keys to increase or decrease the value of the underlined digit to define the “Standard” value. Press [Measure]. If fluorometer shows "Calibration Finished", the fluorometer is now calibrated. Press [Return]. This calibration will stay in the fluorometer even it is turned off.
3. Measure: Take a quartz mini-tube (pre-cleaned with an oil solvent is recommended), and add 0.2mL of dH2O (or solvent used in your oil extraction procedure) as "Blank". Place the tube into the fluorometer sample holder and close the cover.
4. From fluorometer Main screen, press [Measure] → [Assay 1] (or the assay you selected earlier in calibration) → [Blank].
5. Remove the blank solution from the “Blank” tube as completely as possible, and transfer 0.2mL of sample solution into the same tube as "Sample" now. Filter to reduce turbidity first if needed. (Using the same mini-tube will reduce the variation from tube to tube and achieve the desired low detection limit.)
6. Place the “Sample” tube into the sample holder and close the cover. Press [Measure] and the oil concentration will be displayed in the window. Record the data, or press [Save] to save the data for later retrieval, or press [Return] for the next sample. Note: if “Sample” concentration is higher than the upper limit, dilute the sample and repeat measurement.