

PART 1 GENERAL

1.1 Section includes:

- A. Online sensor to detect mineral oils in water.

1.2 Measurement Procedures

- A. The method of detection is by UV fluorescent measurement for polycyclic aromatic hydrocarbons (PAH)
 - 1. Excitation wavelength: 254 nm
 - 2. Emission (measurement) wavelength: 360 nm

1.3 Alternates

- A. Other methods of such as those that require oil to be extracted into an organic solvent prior to measurement are not acceptable.
- B. Other methods of such as those that require addition of a detergent surfactant to a sample prior to measurement are not acceptable.
- C. Other methods of such as those that require measure turbidity of the sample (surface scattering) are not acceptable.

1.4 System Description

- A. Performance Requirements
 - 1. Range
 - a. Low: 0 to 50 ppb and 0 to 500 ppb in relation to PAH calibration standard, corresponding to 0.1 to 1.5 ppm and 0.1 to 15 ppm of oil calibration standard
 - b. High: 0 to 500 ppb and 0 to 5000 ppb in relation to PAH calibration standard, corresponding to 0.1 to 15 ppm and 0.1 to 150 ppm of oil calibration standard
 - 2. Resolution: 0.1 ppb ($\mu\text{g/L}$) PAH in the lowest measuring range
 - 3. Limit of detection: 1 ppb PAH
 - 4. Reproducibility: 2.5 % of measurement value at a constant temperature
 - 5. Accuracy: 5 % of measurement value $\pm$ 2 % from measurement range limit at a constant temperature
 - 6. Response time: 10 seconds (T_{90})

1.5 Certifications

- A. CE certified

1.6 Environmental Requirements

- A. Operational Criteria
 - 1. Temperature:
 - a. Sample: 1 to 40 °C (34 to 104 °F)
 - b. Ambient: -5 to 45 °C (23 to 113 °F),
Sensor wetted by at least half from the measuring medium: -25 to 55 °C (-13 to 131 °F)
 - 2. Pressure:
 - a. Sensor: 30 bar maximum

- b. Flow cell: 1 bar maximum
- c. Ball valve insertion mounting hardware: 6 bar maximum
- 3. Sensor distance, wall to ground: 100 mm (3.94 in.) minimum

1.7 Warranty

- A. The product includes a one-year warranty from the date of shipment.
- B. Optional service agreement: annual preventive maintenance (Hach Service Partnership Program)

1.8 Maintenance Service

- A. Inspection interval: every 2 years
- B. Lamp replacement interval: every 4 years
- C. Routine maintenance: clean the optics as conditions require

PART 2 PRODUCTS

2.1 Brand

- A. HACH
 - 1. Model FP 360 sc Oil-in-Water Online Sensor

2.2 Manufactured Unit

- A. Display units: ppb, ppm, µg/L, mg/L
- B. Calibration: Factory calibrated with UV fluorescence standard or process calibration with results of a grab sample analysis. The sensor compensates for the interference effects of ambient light and UV lamp output fluctuations.
- C. The sensor operates reagent-free without sample conditioning in the range from 0 to 200 ppm total suspended solids in the sample.
- D. The sensor can be connected to a HACH sc controller.
- E. Connection information:
 - 1. Sensor: 8-pin (PUR)
 - 2. Controller: M12

2.3 Equipment

- A. Materials:
 - 1. Measurement sensor:
 - a. Housing: stainless steel (1.4571 / AISI 316Ti) or titanium
 - b. Optic bracket: polyoxymethylene (POM)
 - c. Housing bolts: stainless steel (1.4571 / AISI 316Ti)
 - d. Measurement window: synthetic quartz glass (Suprasil)
 - e. Gaskets:
 - 1) Housing: Viton®
 - 2) Measurement window: nitrile butadiene rubber (NBR)
 - 2. Flow cell:
 - a. Housing: polyoxymethylene (POM)
 - b. Installation board: polyvinyl chloride (PVC)

- c. Gaskets: nitrile butadiene rubber (NBR)
- d. Fittings: nickel-plated brass
- 3. Hanging ring (Shackle): Stainless steel (1.4301 / AISI 304)
- 4. Chain mounting hardware: Stainless steel (1.4571 / AISI 316Ti)
- 5. Ball valve insertion mounting hardware: components in contact with the sample are made from stainless steel (1.4408 / CF8M or 1.4571 / 316Ti), PTFE and NBR.
Flange sets are either made from stainless steel (1.4571 / AISI 316Ti) or carbon steel (1.0037)

2.4 Components

- A. Standard equipment:
 - 1. Sensor with cable and hanging ring (shackle)
- B. Required equipment:
 - 1. HACH sc controller
- C. Optional equipment:
 - 1. Flow cell or chain mounting hardware or ball valve insertion mounting hardware
 - 2. HACH high output air blast cleaning unit (HOAB) (only in combination with chain mounting hardware)
- D. Dimensions:
 - 1. Sensor:
 - a. Without plugs or suspension pin: 68 x 306 mm (2.68 x 12.05 in.)
 - b. With suspension pin: 68 x 399 mm (2.68 x 15.71 in.)
 - c. With optional cleaning unit: 68 x 413 mm (2.68 x 16.26 in.)
 - 2. Flow cell:
 - a. Without fittings: 98 x 98 x 150 mm (3.86 x 3.86 x 5.91 in.)
 - b. Installation board: 600 x 300 x 10 mm (23.62 x 11.81 x 0.39 in.)
 - 3. Cable: 1.5 or 10 m (4.9 or 32.8 ft.)
- E. Weight:
 - 1. Sensor:
 - a. Stainless steel: 2.8 kg (6.1 lbs.)
 - b. Titanium: 1.8 kg (4.0 lbs.)
 - 2. Flow cell:
 - a. 0.6 kg (1.3 lbs.) approximate
 - b. With installation board: 2.0 kg (4.4 lbs.) approximate
 - 3. Chain mounting hardware:
 - a. 5 kg (11 lbs.) approximate
 - 4. Ball valve insertion mounting hardware:
 - a. 18 kg (40 lbs.) approximate

2.5 Accessories

- A. Extension cable (up to total maximum length of 40 m (131 ft.))

PART 3 EXECUTION

3.1 Preparation

- A. The sensor may need to be installed with additional accessories depending on its application.

1. Open channels, shafts, tanks (suspended solid matter 200 mg/L maximum):
 - a. Install with chain mount kit
 - b. Sensor with or without cleaning unit
2. Measurement media with low suspended solid matter and continuous, low sample throughput:
 - a. Install with flow cell
 - b. Sensor without cleaning unit
3. Closed pipe loops, tank walls (suspended solid matter 200 mg/L maximum)
 - a. Install with ball valve insertion mounting hardware
 - b. Sensor without cleaning unit

3.2 Installation

- A. Contractor will install the sensor in strict accordance with the manufacturer's instructions and recommendation.
- B. Manufacturer's representative will include a half-day of start-up service by a factory-trained technician upon request (additional costs).

3.3 Manufacturer's Service and Start-Up

- C. Contractor will include the manufacturer's services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.
- D. Contractor will include a manufacturer's Service Agreement that covers all the manufacturer's recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.
- E. Items A and B are to be performed by manufacturer's factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.
- F. Use of manufacturer's service parts and reagents is required. Third-party parts and reagents are not approved for use.

END OF SECTION