enviroFlu

30SXXXXX0

PAH, oil-in-water using UV fluorescence

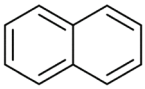
enviroFlu-HC is the new generation of immersion sensors for measurement of oil-in-water. The used measuring principle of UV fluorescence is many times more sensitive than the conventionally used infrared scattering or absorption process. This makes it possible to determine even the slightest traces of PAH's, such as in drinking water, but also in cooling water condensates. Application areas include the petrochemical industry, leakage detection in cooling and wastewater streams as well as environmental monitoring. The devices enable both stationary use in shafts, flows or piping, and mobile use through an optional hand-held measuring instrument. An innovative coating reduces fouling of the optical measuring window and minimizes the maintenance required.

Benefits

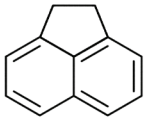
- Without sampling and preparation of test samples
- Real time sensor
- Without reagents
- High sensitivity and selectivity
- Optical window with nano coating

Applications

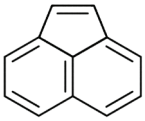
- Drinking water
- Wastewater
- Airports
- Cooling water
- Desalination plants
- Refineries
- Pipeline monitoring
- Bilge water monitoring
- Exhaust gas cleaning with approval for ship use according to IMO regulation MEPC.184(59)



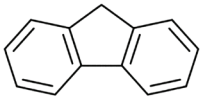
1. Napthalene



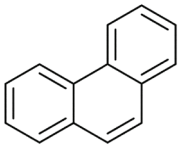
2. Acenaphthene



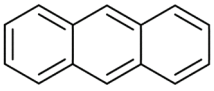
3. Acenaphthylene



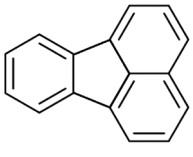
4. Fluorene



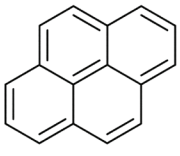
5. Phenanthrene



6. Anthracene



7. Fluoranthene



8. Pyrene

Technical Specifications

Measurement technology	light source	Xenon flash lamp + filter (254 nm)
	detector	Photo diode + filter (360 nm)
Measurement principle		Fluorescence
Parameter		PAH, oil
Measuring range	enviroFlu-HC 500	PAH: 0...50 ppb, 0...500 ppb Oil: 0...1.5 ppm, 0...15 ppm typical
	enviroFlu-HC 5000	PAH: 0...500 ppb, 0...5000 ppb Oil: 0...15 ppm, 0...150 ppm typical
Measurement accuracy		enviroFlu-HC 500 0.3 ppb
		enviroFlu-HC 5000 0.5 ppb
Turbidity compensation		No
Data logger		No
T100 response time		≤ 10 s
Measurement interval		≤ 5 s
Housing material		Stainless steel (1.4571/1.4404) or titanium (3.7035)
Dimensions (L x Ø)		311 mm x 68 mm
Weight	stainless steel	~ 2.7 kg
	titanium	~ 1.9 kg
Interface	digital	RS-232 (TriOS)
	analog	4...20 mA, 0...5 V
Power consumption		≤ 3.5 W
Power supply		12-24 VDC (± 10 %)
Maintenance effort		Typically ≤ 0.5 h/month
Calibration/maintenance interval		24 months
System compatibility		Analog Out (0...5 VDC, 4...20 mA)
Guarantee		1 year (EU: 2 years)

INSTALLATION

Max. pressure	with SubConn	30 bar
	with fixed cable	3 bar
	in FlowCell	1 bar, 2-4 L/min
Protection type		IP68
Sample temperature		+2...+40 °C
Ambient temperature		-5...+55 °C (0...+40 °C for specified accuracy)
Storage temperature		-20...+80 °C
Inflow velocity		0.1-10 m/s

DNV·GL

TYPE APPROVAL CERTIFICATE

This is to certify that the undernoted product(s) has/have been tested in accordance with the relevant requirements of the DNV GL Type Approval System.

Certificate No.	**61 900 - 14 HH**
Company	**TriOS Mess- und Datentechnik GmbH** **Bürgermeister-Brötje-Str. 25** **26180 Rastede, GERMANY**
Product Description	**Submersible sensor for oil-in-water measurement**
Type	**enviroFlu-HC 500, enviroFlu-HC 5000**
Environmental Category	**A, EMC2**
Technical Data / Range of Application	**UV-fluorometer for detection of PAH (Polycyclic Aromatic Hydrocarbons) in water.** **Power supply: 12 ... 26 VDC (+/-10%)** **Interface: 4 ... 20 mA** **Connector: M12 industrial connector with 5m fixed mounted cable** **Material: Measuring head: POM black with fused silica** **Housing: Stainless steel 1.4571** **Hardware version: V3.0** **Software version: V1.80**
Test Standard	**GL Guidelines for the performance of Type Approvals, Chapter 2, Edition 2012** **Resolution MEPC.184(59) adopted on 17. July 2009** **"2009 Guidelines for exhaust gas cleaning systems - Chapter 10 Washwater"**
Documents	**Test reports: paconsult no. 13-5010 Rev.1 (27.05.13), TÜV Nord Cert GmbH, Abt. "EMV Services" no. 13/13136-2 (11.10.13), TriOS Pressure test (03.01.14), JOWO pressure test (07.01.14); TriOS no. PB_EMV_HC1401 (14.04.14), no. PB_EMV_HC1402 (14.04.14), no. PB_EMV:HC1403 (16.04.14), no. PB_EMV_HC1404 (16.04.14); Data sheet enviroFlu-HC (release V5); Manual "enviroFlu submersible fluorometer for detection of polycyclic aromatic hydrocarbons (PAHs) in water" (release 16.05.14),** **"Bericht zur Prüfung der Sonde enviroFlu-HC für den Einsatz entsprechend MEPC.184(59) Guideline for Exhaust Gas Cleaning Systems" (26.08.13);** **Drawings, part lists, circuit diagrams acc. To submitted files.**
Remarks	**This certificate is issued on the basis of GL Guidelines for the Performance of Type Approvals, Chapter 1 - Procedure (VI-7-1), Edition 2007.** **The "enviroFlu-HC" must be operated and calibrated in accordance with the requirements and intervals as specified in the operating instructions.** **Air bubbles in the washwater flow at the place of PAH(phe equivalent) measurement should be avoided.** **In case the turbidity of the washwater is above 5 NTU, the enviroFlu-HC must be compensated for turbidity otherwise PAH(phe equivalent) deviates more than 5.**

Valid until **2019-06-23**

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File No. **I.A.03**

Hamburg, 2014-06-24

Type Approval Symbol GL

DNV GL

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Klaus-Peter Schröder

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Certificate No. **61 900 - 14 HH**

Further Technical Data / Range of Application

Version	Component	Measurement Technology	Smallest range	Typical range
enviroFlu-HC 500	$PAH_{(phe\ equivalents)}$	Fluorescence	0 – 50 µg/l	0 – 500 µg/l
enviroFlu-HC 5000	$PAH_{(phe\ equivalents)}$	Fluorescence	0 – 500 µg/l	0 – 5000 µg/l

The measuring range is depending on the washwater flow rate and can be adjusted in accordance with the requirements of Resolution MEPC.184(59) adopted on 17. July 2009 "2009 Guidelines for exhaust gas cleaning systems - Section 10 "Washwater".
For any washwater flow rate ≤ 2.5 t/MWh the use of UV light measurement technology is recommended.
The enviroFlu-HC 5000 have been demonstrated the equivalence to cover all ranges of flow rates under surveillance and to the satisfaction of GL.

The "enviroFlu-HC" is found to fulfil the requirements for the $PAH_{(phe\ equivalent)}$ measurement of a washwater monitoring system according to Resolution MEPC.184(59) "2009 Guidelines for exhaust gas cleaning systems - Section 10 "Washwater".
Additional equipment will have to be installed.

The operating temperature is from 5°C to 55°C, whereas the specified detection limits are only valid in the temperature range between 5°C to 40°C.

The "enviroFlu-HC" meets the following requirements of the Resolution MEPC.184(59):

- Measurement technology acc. MEPC.184(59), 10.1.3.3:
  For any washwater flow rate ≥ 2.5 t/MWh the recommended fluorescence measurement technology is used.
  For any washwater flow rate ≤ 2.5 t/MWh the equivalence to cover the high concentration limits have been demonstrated under surveillance and to the satisfaction of DNV GL.
- Measurement range acc. MEPC.184(59), 10.1.3.3 and 10.1.3.4:
  The allowed short time exceedance of the discharge concentration limit is covered by the typical measurement ranges.

The performance criteria for PAH monitoring equipment acc. MEPC.184(59), 10.2.3:
The capability of monitoring the $PAH_{(phe\ equivalent)}$ in water in a range to at least twice the discharge concentration limit is covered by the typical measurement ranges.
Because of turbidity correction by a calculation equation, the "enviroFlu-HC" has demonstrated to operate correctly and not deviate more than 5% in washwater with turbidity within the working range.

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