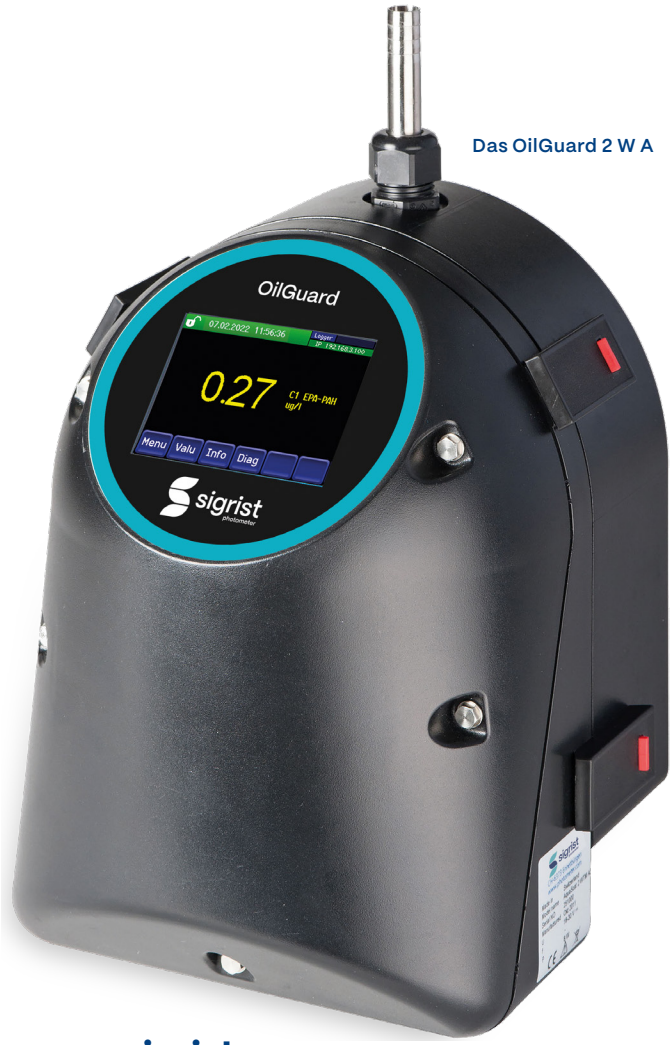
sigrist photometer

APPLICATION NOTE

Measuring Oil Accurately

Why is it a Challenge?

If water is contaminated with oil, even the smallest traces of oil must be detected reliably. Both industrial companies and water suppliers face this challenge. Why? And what exactly are the challenges of accurate oil measurement? .



Das OilGuard 2 W A

Oil enters the water in various ways. Many industrial companies use surface water as cooling water, which they discharge back into the environment at the end of the process, oil spills happen with ships or leaking storage tanks. These circumstances make it essential for water suppliers to check the raw water for traces of oil before it goes into drinking water treatment.

Customers often want to set their alarm levels with respect to a threshold value. Oil contaminations are – if present – on the ppm-scale. Oil and water do not mix well which makes factory calibration with oils challenging. Therefore, Sigrist had to find a solution to address the technical problem and the customer challenges simultaneously.

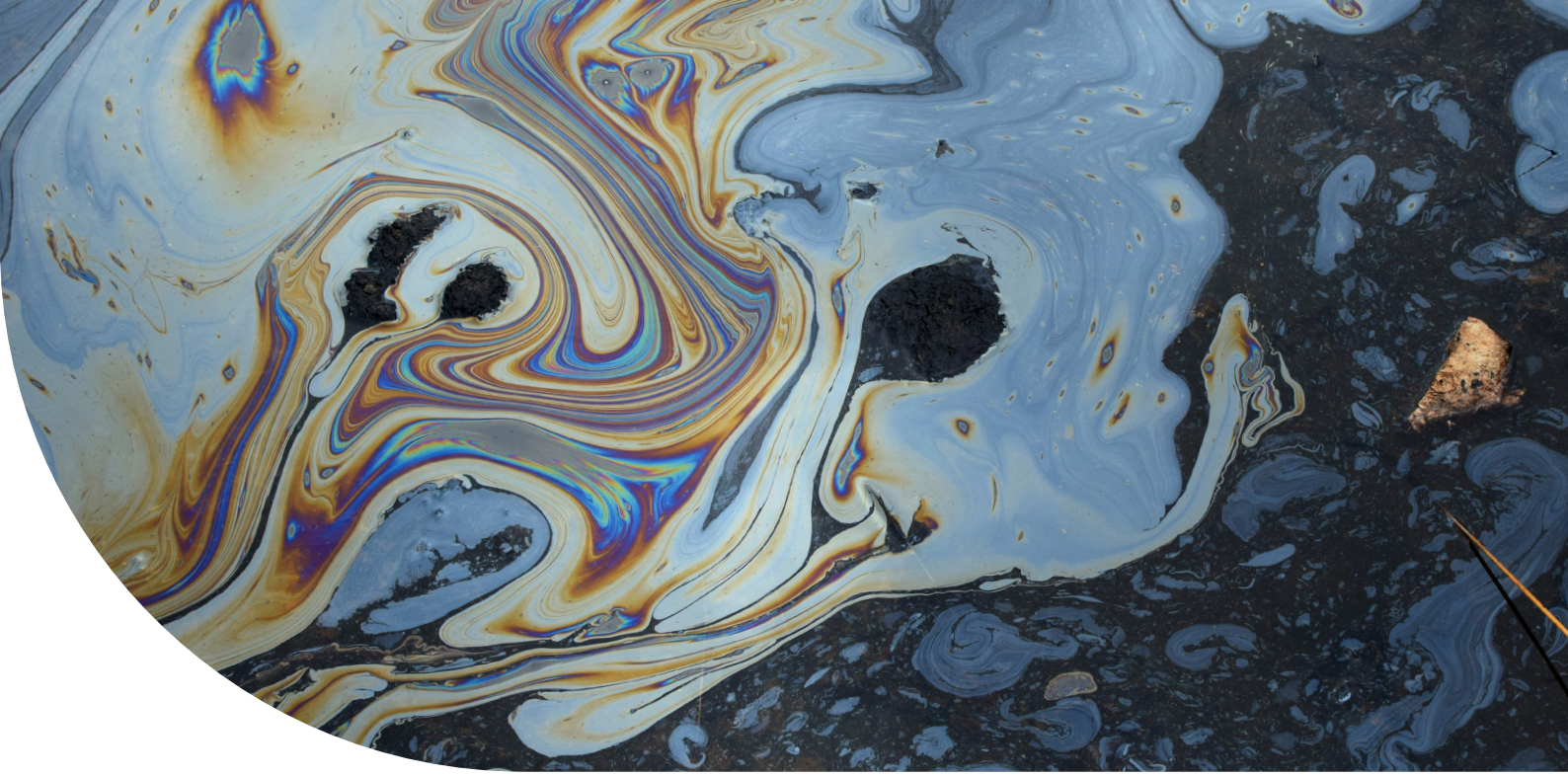
The Solution

The OilGuard 2 W (A) uses fluorescence for sensitive oil contamination detection. The water sample is measured in a free-falling water jet without touching any optical component. The instrument is factory-calibrated with 16 EPA-PAH standards[1] to ensure reproducibility. Additionally, there is a conversion factor to ISO 9377-2 oil. The re-calibration in the field is performed with a secondary standard. The instrument is operated through its integrated touchscreen in an intuitive way.

The Customer Benefit

The cost of purchasing an OilGuard is many times lower

[1]The EPA standard contains 16 polyaromatic hydrocarbons compounds.



than the costs generated by an oil spill (contamination of filter media and the environment).
Further advantages:

- No manual cleaning of optical components. This reduces operational costs to a minimum.
- Reliable and reproducible measurement results allow a clear statement about contaminant levels.
- Simple and reproducible calibration check in the field with secondary standard. This process is fast.
- Integrated control unit with Touchscreen for intuitive and simple operation.
- Compact instrument with high flexibility to extend to customer needs.

Technical Data

How does the measurement really work? The OilGuard 2 W (A) measures oil contaminations in an indirect manner. It uses the fact that certain components in oils fluoresce. These components are typically polyaromatic (PAHs) or unsaturated hydrocarbons. Oils and PAHs have a poor solubility in water. This fact makes quantitative oil calibration very difficult. Mineral oils such as Diesel are defined by their calorific value and their combustion properties. They can however vary in chemical composition. Tab. 1 shows typical values for combustibles using the standard factory calibration for the OilGuard 2 W (A).

Substance	Reading for 1 ppm oil sample
Diesel (local gas station)	280 ± 110 ug/l EPA-PAH
Raw oil	210 ± 40 ug/l EPA-PAH
Domestic fuel oil	1500 ± 750 ug/l EPA-PAH
ISO 9377-2 oil	250 ± 25 ug/l EPA-PAH

Tab. 1

Typical Application

Drinking water suppliers employ the OilGuard 2 W (A) at critical abstraction points. An example is ground water catchments close to highways. In case of traffic accidents there is a high probability of oil spilling and oozing into ground water. For this reason, water plants close to highways use catchment basins as buffers. This ensures safe drinking water and protects equipment like filtration media

Further Practical Measurement Task

The OilGuard 2 W (A) could potentially be used to assess the biological content in a water sample. Algae and certain microorganisms also fluoresce upon excitation with UV light. This would even correlate with SAC 254 values.

Fun fact

If you've ever been to Australia, you're sure to have met the cuddly wombats. Researchers have discovered that these animals fluoresce under UV light.
According to royalsocietypublishing.org, fluorescence is created when a chemical, such as a protein, absorbs ultraviolet light and then emits a longer wavelength of light. However, with regard to the Wombats, it remains unclear if fluorescence has any biological role for them or any other mammals.

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