

Application Report

Oil (HC) Traces in Raw Water

The water entering into the intake of a water recycling plant originates from different sources: ground water, rivers, lakes, wells. Accordingly, this water is likely to be contaminated in different ways. Solid matter, dissolved organic carbons, humic acids, germs or micro pollutants can occur in any combination.

If the water catchment is located in an industrial area or if there is an increased risk that the water could be contaminated with mineral oil as a result of accidents (ships, vehicles), the raw water is often additionally examined for oil traces.



Picture 1: Industry & water source



Picture 2: Installation example of an Oil-in-Water Analyzer OilGuard

If oil contamination is detected, this contamination usually consists of a mixture of hydrocarbons such as diesel, petrol, kerosene, lubricants etc. and in an unknown combination. SIGRIST's Oil in Water Analyzer OilGuard can detect that sum hydrocarbon contamination, but it cannot define the hydrocarbons contained.

Different hydrocarbons fluoresce with different intensities. For this reason and because the composition of the contamination is usually not known, an oil-specific calibration of the measuring instrument cannot be made. The Oil in Water Analyzer OilGuard thus works as a "watch-dog" and the figure displayed is in FLU (fluorescence unit).

The customer often wishes to verify the results measured by a laboratory measurement. This comparison is delicate since the measuring methods and the underlying physical principles do not usually correspond. As a consequence, large deviations have to be accepted.

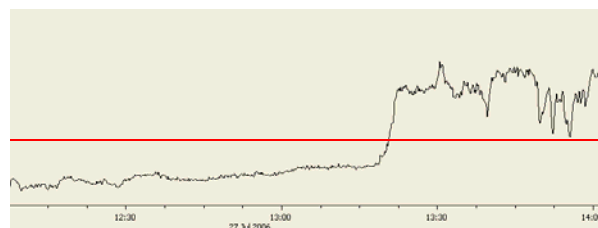
Benefits

A continuous monitoring of the water for oil traces provides an immediate detection of possible contamination even if the cause of such a contamination happened some time in the past. As a result, the contaminated water can be rejected.

Typical application

Oil tank farms, refining and petrochemical industries, airports and transit routes for heavy goods traffic are potentially endangered areas in which oils and fats can reach the ground and/or surface water.

Practical measurement (example):



The diagram shows the course of an oil trace monitoring with two typical water conditions:

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1. The basic fluorescence of the raw water. Water, even if it is completely free of hydrocarbons, generates a small amount of UV fluorescence. This is detected as a slightly fluctuating basic value. This value is within the range of 0.03-0.07 FLU. (Drinking water at SIGRIST has a basic fluorescence of 0.038 FLU).
2. Water contaminated by hydrocarbons. As soon as a hydrocarbon contamination occurs, the measured value rises and can do so to any value.
3. The alarm threshold. The red line corresponds to the set alarm value in this application.

Calibration in accordance with ISO 9377-2

In many cases, a display of the contamination in ppm oil (hydrocarbon) is requested.

An internationally accepted standard method is defined in ISO 9377-2.

The calibration liquid for this method consists of a standardized mixture of n-alkanes in the range of C10 – C40, which is known under the term "mixture of diesel and lubricating oil" and can be purchased from various suppliers of chemical products (this calibration liquid is expensive!).

Any previous installed or newly purchased Oil in Water Analyzers OilGuard can be programmed in cooperation with the customer on site. This allows the display in ppm on the basis of the ISO Standard 9377-2:

The essential steps of programming are as follows:

1. Determination of the basic fluorescence of the raw water without any hydrocarbon contamination
2. Programming of the Oil in Water Analyzer OilGuard (Reference manual, chapter 4.7.3.)

The accuracy of the measurement on the basis of this standard is $< \pm 10\%$.

If desired, the customers can procure the corresponding standard themselves in order to check the calibration.

Products

SIGRIST products and configuration:

- OilGuard 2 230 VAC or OilGuard 2 115 VAC
- Flow cell KPFLJ VA OilGuard
- Optionally: various system modules

Parameter settings

- Select a measuring range in FLU
- Adjust water flow
- Determine threshold value for preliminary alarm and alarm together with the customer
- Optionally: calibration in accordance with ISO 9377-2

Properties of the SIGRIST Oil-in-Water Analyzer OilGuard » customer benefits

- Free-fall concept, the sample does not contact optics
 - » No falsifying of the measured values and no drift because of window soiling
 - » Very long maintenance interval
- Dual beam measurement: measurement beam and reference beam is constantly measured
 - » Allows a very precise measurement
 - » Ageing of the light source does not have an influence on the measurement
- Adjustment with checking unit
 - » Allows simple checking of the instrument and recalibration without chemicals
- The design of the instrument and the materials used allow lowest inherent brightening effect
 - » A low zero drift guarantees long-term stability



Picture 3: Oil-in-Water Analyzer OilGuard 2 with flow cell KPFLJ VA