

# Phenol - Oil in Water Analyser

Oil in Water and Phenol Analysis for Water Treatment Plants



# Phenol - Oil in Water Analyser

The UVpcx is a state-of-the-art water monitoring system specially designed for high reliability, low operating cost and compact size, It is backed by more than ten years of expertise.

Ultra-Violet spectroscopy, the most reliable and stable method, is used to analyse the specific parameters: ammonia, COD, hydrocarbons, nitrate, chlorophyllA and fluorescent tracers.

Optical methods are also used for turbidity and colour while electrodes are used for pH, dissolved oxygen and conductivity.

Based on a modular design, the UVpcx can be configured as :

Mono-parameter system: on many process control applications, only one parameter is critical. In that case, the UVpcx offers a cost-competitive solution.

Multi-parameter system: water chemistry is complex and to meet the regulations for drinking water or wastewater, many parameters have to be taken into account.

Designed in compliance with CE electromagnetic Standards and using a watertight IP64/Nema4x box, the UVpcx is the ideal instrument for industrial applications such as:

Water treatment plants

Industrial effluents monitoring

River monitoring

Chemical, oil and food industries

## Benefits of Standard Methods and On-line Analysis

The standard methods are based on traditional and well-known chemical methods that are convenient for laboratory use but not suitable for on-line analysis.

The automation of such traditional methods leads to a complex system that would require high maintenance and have poor reliability. Moreover, the cost of reagents is prohibitive and some of these are dangerous pollutants.

Also, the measuring time is generally not compatible with process control.

For these reasons, the UVpcx uses optical methods for stable, fast and reliable measurements for specific parameters like ammonia, COD, hydrocarbons, nitrate, fluorescent tracers, and color.

There is no drift in measurement as compared to the electrode based system and the need for costly standard solutions is also avoided.

On some applications, the results on UVpcx can be more accurate than those obtained by standard colorimetric methods that are subject to many interferences, for example chloride for nitrate and COD analysis.

## Multi-Language

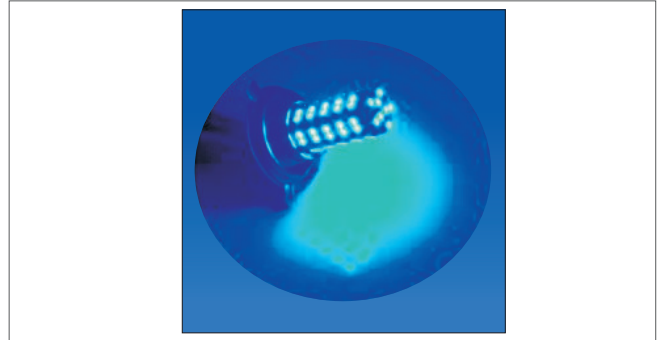
The touch screen human interface provides an incomparable facility for setting parameters, calibrating or testing the instrument, in any one of these languages:

English, Spanish, French, German, Dutch, Italian, Portuguese, simplified Chinese, traditional Chinese, Malay, Korean, Japanese, Thai.

## Longer Lamp Life

The **UV xenon lamp** is specified for  $10^9$  flashes that give longer years lifespan with a measurement every minute.

This considerably reduces maintenance and the risk of wrong measurement due to aged lamps or replacement of lamps.

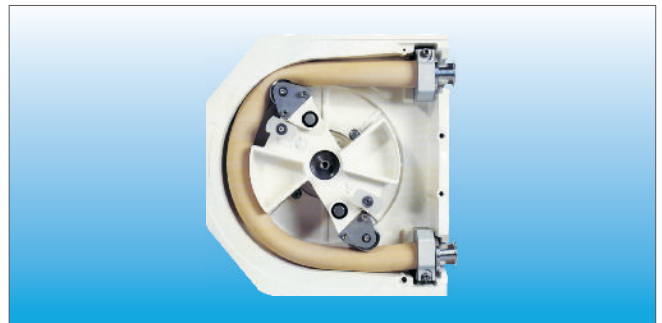


## Sampling Pump

An optional built-in peristaltic pump can be added to take samples directly from rivers, reservoirs or open channels with a maximum pumping height of 3 meters.

A strainer prevents large suspended solids from entering the analyser.

The easy-to-load pump head facilitates tubing replacement.



## No Filtration Required for River Water or Waste Water

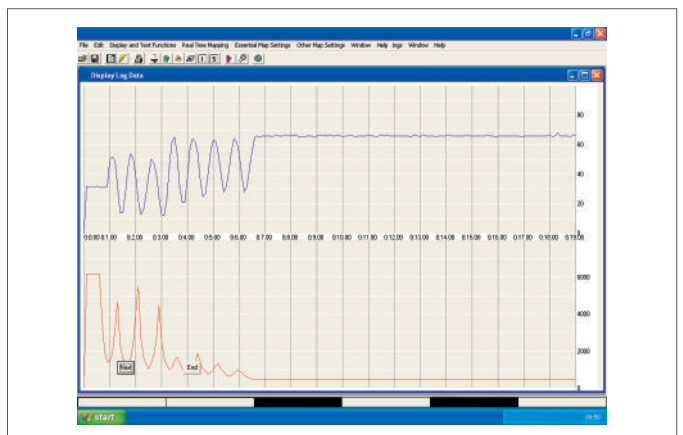
Facilitated by a large bore tubing and a German patented inlet electric-valve with pivoting armature, unfiltered water can be admitted into the UVpcx analyser with very low risk of clogging.

This significantly reduces the initial cost of the measuring system and especially cost of maintenance.

A double wavelength measuring system compensates the effect of turbidity and suspended solids for COD, nitrate, hydrocarbons, fluorescent tracers and colour measurement.

## Data Logging with RS232 Download

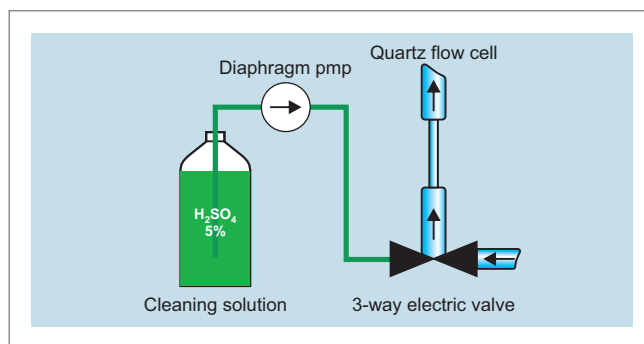
All the measurements over a few weeks can be downloaded with the RS232 module using a hyperterminal of Windows on any laptop, no specific software is required. The data are compatible with standard worksheets such as Excel for graphs, printing or archiving.



## Automatic Cleaning System

Once a day, a low cost cleaning solution (5% sulphuric acid) is automatically injected into the flow cell to clean it. An auto-zero is performed at the same time.

The autonomy is about 2 weeks with the built-in 2-litre tank. An alarm is generated if the cleaning solution tank is empty.



## Low Operating Cost

The operating cost is limited to the refilling of the 2-litre tank of cleaning solution every 2 weeks with 5% sulphuric acid on distilled water. For effluent measurements, tap water instead of distilled water can be tolerated after checking.

## Oil in Water / Phenol Measuring Principle

The measuring principle is based on fluorescence: when lighted at a specific wavelength (excitation), some chemicals re-emit light (emission) at another longer wavelength.

Very few chemicals are fluorescent and give a highly selective measurement.

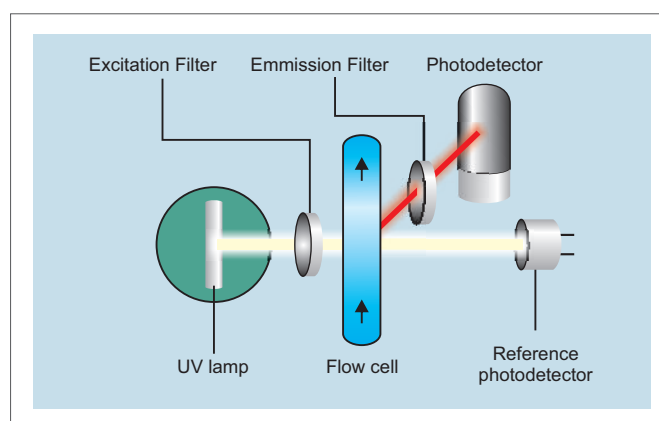
The emission light is detected by a high sensitivity photo multiplier to detect very low concentrations from a few ppb.

The excitation light is controlled by a detector to compensate any variation of the source.

The table below gives the relative intensity of some aromatic hydrocarbons.

As compared to probe type measurements, this system achieves a higher sensitivity and reliable measurement due to the absence of parasite light reflections and a stable water column.

Anthracene	42
Benzene	10
Biphenyl	20
Chlorobenzene	7
Fluorobenzene	10
Naphtalene	35
Phenanthrene	25
Phenol	18
Propybenzene	17
Styrene	10
Toluene	17



## Applications

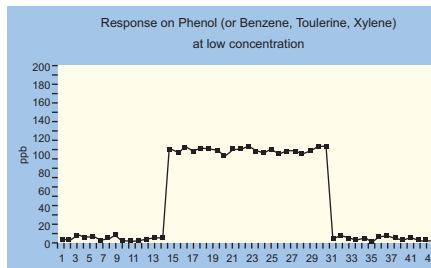
### Lakes, Reservoirs and River Water

Hydrocarbons are dangerous pollutants that have to be detected very early in reservoirs or rivers for producing drinking water. A fast and reliable measuring system is necessary and UV fluorescence is the best option. Rhodamine and fluorescein are the major tracers used for environmental studies (for example underground water contamination or transit time of pollutants in a river). Very low concentrations (ppb level) need to be detected and fluorescence is the only fast and selective method applicable. The optional built-in peristaltic pump can take water directly from the river or reservoir.

## Cooling Water

The level of hydrocarbons in cooling water is a critical parameter for refineries and oil & gas industries.

A fast and reliable on-line measuring system is necessary and UV fluorescence is the only method that can meet these requirements.



## Wastewater

The effluents of refineries and chemical plants have to stay below limits to meet environmental regulations. A reliable and low maintenance measuring system is required, which only UV fluorescence can achieve. The automatic cleaning system of UVpcx avoids the need for any manual operation to clean and there is no clogging or oil deposition on the flow cell. This feature also gives an automatic zero cal option during cleaning.

## Comparative Table for Hydrocarbon Analysers / Analysis

Method	UV fluorescence with close flow cell and xenon lamp (UVpcx)	UV fluorescence with open flow cell and mercury lamp	Extraction and IR absorption	Stripping and FID
Measuring time	< 10 seconds	<10 seconds	> 5 minutes	> 5 minutes
Sensitivity	High	Medium	High	Medium
Use of dangerous solvent (CCL4, freon)	No	No	Yes	No
Use of flammable gas	No	No	No	Yes
Air supply	No	Yes	No	No
Influence of molecular weight	No	No	No	Yes
Detection of total hydrocarbons	No, aromatics only	No, aromatics only	Yes	Yes
Periodic change of lamp or parts	No	Yes	Yes	Yes
Simple hydraulic system	Yes	No Flow control	No (Extraction type)	No (Stripping type)
Maintenance	Very low	Medium	High	High
Filtering	No need	Inevitable to avoid clogging of the calibrated hole	Inevitable on waste water	Inevitable on waste water
Automatic cleaning system	Yes	No, impossible Require manufacturer's specialist for cleaning	Mostly manual	Mostly manual
Operating cost	Low	Medium	High	High
Size	Compact	Big	Big	Big
Weight	14 kg approx.	> 30 kg	> 30 kg	>30 kg
Transportable by car or passenger plane	Yes	No	No	No
Installation time	Few minutes	Tens of minutes	Hours	Hours



## Specifications

1.0 General				
1.1 Manufacturer	AWA Instruments Singapore			
1.2 Series	CX 1000 series Oil in Water, Phenol			
1.3 Channels	Single channel analyser			
1.4 Method	UV Fluorescence : OIW , Phenol			
1.5 Range	Model	CX1000-6032	CX1000-6012	CX1000-6022
	Oil	0-10.0 ppm	0-100 ppm	0-1000 ppm
	Phenol	0-1.00 ppm	0-10.0 ppm	0-100.0 ppm
1.6 Calibration	Manual calibration			
1.7 Operation cycle	Continuous or batch type			
2.0 Sample conditions				
2.1 Temperature	+5 to +80 Deg. C			
2.2 Pressure	0.3-2 bar			
2.3 Flow rate	5-10 LPH			
2.4 Suspended solids content	< 100 micron			
3.0 Analyzer				
3.1 Type	Advanced microprocessor based system			
3.2 Accuracy	+/-5% of FS			
3.3 Display type	Alpha numeric display 240 x 128 pixels LCD with backlit			
3.4 Response time	Less than 10 seconds			
3.5 Measuring cycle	Programmable / normally 3-5 mins			
3.6 Analog output	0/ 4-20 mA. DC, Isolated			
3.7 Enclosure protection	Comply to IP54			
3.8 Relay outputs	Dry contact alarms for high and high-high set points, monitor failure, microprocessor failure			
3.9 Power supply	110- 230V AC,50Hz, 30 VA			
3.10 Temp limits	0-50 Deg C.			
3.11 Digital output	RS 485/ RS 232 (optional – please specify if required)			
3.12 Ambient temperature	0 to 50 Deg. C			



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