ICON Analyzer

Dedicated online photometer for water and wastewater analysis

Metrohm
Process Analytics

Straightforward online water monitoring

If there is one thing that everybody depends on, it is water. We drink it every day. We use it in nearly every industry as a cleaning agent, to moderate processes, or actually as a solvent in production. And once we have used it, it is discharged into the environment again. Therefore, it is of the utmost importance to society to monitor water quality.

Plug and analyze

Given the universal necessity and importance of water, any serious technical solution to monitor its quality should be easy to use, reliable, and of course, sensitive enough and highly accurate. These are in fact the features and benefits that the ICON Analyzer from Metrohm Process Analytics provides. The new ICON Analyzer was developed specifically for the near-continuous analysis of a large number of parameters critical for water quality.

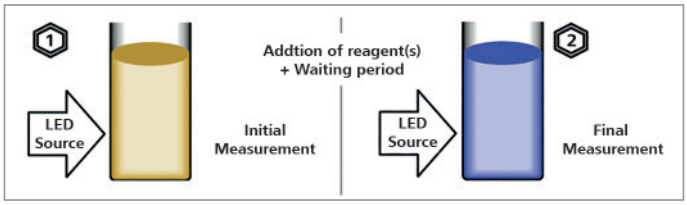
- **Very easy to use:**
  Just connect the power, sample, and reagent lines and the ICON Analyzer is fully operational.
- **Superior reliability:**
  Validation, cleaning and calibration are standard features which significantly reduce downtime and operator intervention.
- **Outstanding sensitivity & accuracy:**
  Depending on the analyte and matrix, the determination ranges of the ICON Analyzer vary from trace µg/L to mg/L.
- **Secure:**
  The electronics part is 100% separated from the wet part of the analyzer.

The ICON Analyzer is dedicated for the analysis of water and wastewater, and can be used in various situations:

- Wastewater effluent
- Surface water
- Drinking water
- Ultrapure water
- Steam and condensate water
- Ion-exchange systems
- Boiler feed water
- Demineralizers

Colorimetric method

For more accuracy, the ICON Analyzer measures twice during one analysis cycle:



The first measurement is from the raw sample as a reference, which compensates for the color and turbidity of the sample and the fouling of the cell. The second measurement of the sample is taken after the addition of color reagent and completion of the reaction. Based on the calibration and the differential absorbance, the software calculates the analyte concentration.

The ICON Analyzer can measure a variety of components in water. All applications have been field-tested and have an excellent analytical performance.

Some common analytes monitored for water quality control:

- Aluminum
- Ammonia
- Chlorine
- Chromium
- Copper
- Cyanide
- Hydrazine
- Iron
- Manganese
- Nickel
- Nitrate
- Nitrite
- Phenol
- Phosphate
- Silica
- Zinc
- And many more

Examples of proven applications

Metrohm Process Analytics has your analysis covered, whether you are measuring industrial waste or high-purity water. We have many Process Application Notes (PAN) and Application Data Sheets (ADS) available for more information.

Silica

Photometric determination of silica

Application fields

Cooling water, high-pressure boiler feed, high-purity water

Silica is used in a variety of industries: from the production of wafers to glass and ceramics manufacturing and chemical production. In the water-steam cycle of power plants, silica is considered one of the major impurities, causing boiler scale and deposits on steam turbine blades. Impurities precipitated out of the water form deposits on heat transfer surfaces, which result in reduced boiler efficiency, overheating, and eventually outages. Silica also plays an important process control role at demineralization plants where deionized water is produced. An increase in the silica concentration signals an exhausted ion-exchange bed and is therefore an indicator that regeneration is necessary.

Iron

Photometric determination of iron(II) and (III)

Application fields

Drinking water, surface water, industrial wastewater, cooling water, high-pressure boiler feed

Iron is quite abundant naturally in our environment; it is also used in many different applications and industries worldwide. Soluble Fe(II) is present in anaerobic water, oxidizing to Fe(III) when exposed to air or other oxidizing agents. The resulting turbidity from less-soluble Fe(III) can cause problems. In drinking water, an excessive presence of iron is a problem, as it affects both the taste and smell. There are many ways for iron in all forms to be introduced into our water sources, making it an important analyte to measure.

Phosphate

Photometric determination of phosphate

Application fields

Surface water, municipal waste, industrial wastewater, cooling water, high pressure boiler feed

Phosphorus compounds are essential to the growth of plant life and other organisms. However, the increasing concentrations of these compounds from wastewater and agricultural runoff create nutrient imbalances in lakes and other areas. This imbalance promotes an increase in algal blooms which can eventually lead to total oxygen depletion (anoxia), resulting in the death of fish and other aquatic animals. Phosphates can be introduced to the environment via agricultural (fertilizer) runoff resulting from rain storms or snow melt. Other wastewaters may also contain higher concentrations of phosphates, introduced by detergents and other cleaning solutions. Boiler water is frequently treated with phosphates to prevent boiler scaling leading to premature boiler failure.

Ammonia

Photometric determination of ammonia

Application fields

Cooling water, surface water, municipal wastewater, industrial wastewater

Ammonia can come from a variety of sources, with agriculture and wastewater treatment among the largest producers. Ammonia is used as a precursor to create many fertilizers. High concentrations of ammonia or ammonium salts are present (depending on the type of fertilizer in use) which contribute nitrogen to the environmental nutrient balance, promoting plant growth. Nitrogen is a limiting nutrient in marine environments, thus its increase due to agricultural runoff or from improperly treated wastewater can create significant ecological imbalances and anoxia, similar to the environmental effect of excess phosphates. Nitrification converts ammonium into nitrite and nitrate. Compounds are typically added to fertilizers to stop this process because nitrite and nitrate are much more water-soluble and contaminate water sources. Wastewater treatment uses both nitrification and denitrification processes to convert ammonium into harmless nitrogen gas, which is then released into the atmosphere.

Other examples available:

Aluminum, chlorine, chromium, copper, cyanide, hydrazine, manganese, nickel, nitrate, nitrite, phenol, zinc

Flexible software for straightforward control

The ICON Analyzer is equipped with a graphical user interface for easy access to your analyses and results. There are multiple user levels offered in the software which are suitable for any operator. With up to 30 programmable steps available for each analysis, the ICON offers more than enough flexibility to adjust to the needs of any user.

Validation, cleaning, and calibration are standard features built in to the analyzer which assist in the optimization of the system and help ensure the most accurate results are obtained. A graphical overview of the most important data from your application is available at your fingertips.

Not only will analysis results be logged into the database, alarms can also be managed. For example, an alarm for low reagent levels can appear in the graphical user interface, sent to a control room for further review by the operator, and it can also be logged in the database.

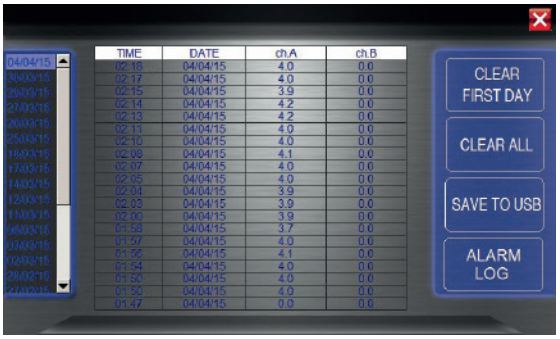
Main analysis screen

Application method

Alarm notification

Method-building choices

Results table



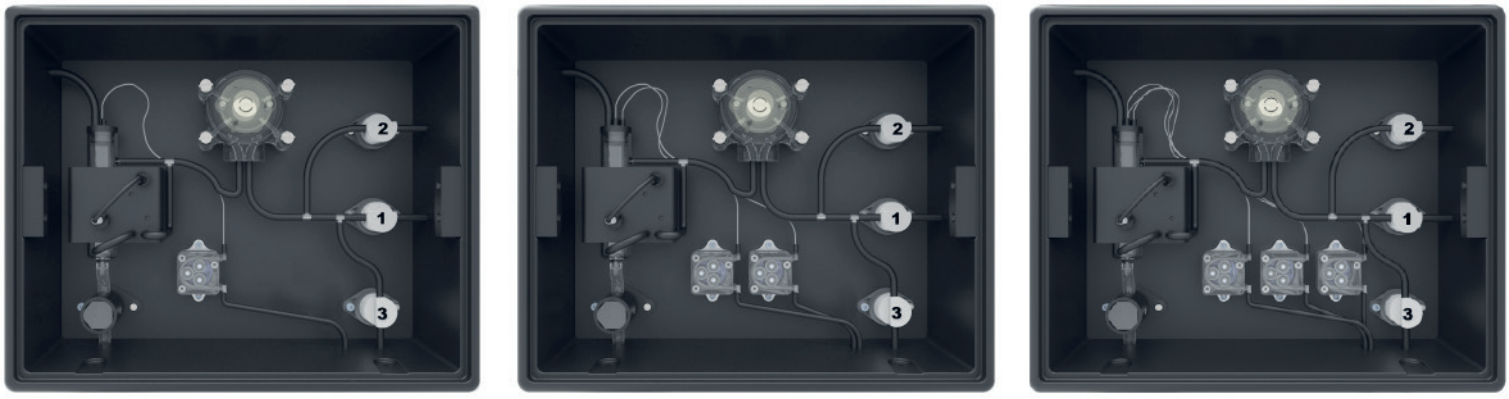
Event log

Simplified layout for easy access

The ICON Analyzer is complete, preconfigured and programmed for your specific application. Just connect the power, sample, and reagent lines and the easy-to-use analyzer is fully operational. The high uptimes and minimal maintenance of the ICON Analyzer lead to lower operating costs. The ICON Analyzer as designed ensures the highest level of robustness in the electronics, mechanics, and hydraulics components.

Features

- Dual compartment enclosure to ensure complete separation between the electronics and the wet part, therefore no leakages possible into the electronics part
- Color touchscreen interface; simple and user-friendly menus and functions
- Multiple user levels
- 3 programmable cycles, with 30 programmable steps per cycle for analysis flexibility
- Long-life LED light source
- Built-in peristaltic pump for sampling
- Thermostated reaction cell
- Automatic validation and automatic cleaning
- 2 sample streams can be monitored
- Up to 3 reagents can be added – simply add a pump for additional reagents, as shown below:



Layout of the wet part of the ICON Analyzer for the addition of 1, 2, and 3 reagents.

Technical specifications

Small dimensions	380 × 210 × 600 mm
Analysis method	Differential photometric absorbance
Analysis frequency	Freely programmable, near-continuous analysis
Installation	Wall mount or bench top support
Ingress Protection	IP54
User adminstration	Password protected input on 2 levels
Digital inputs	online on/off, remote start/stop, sample override, etc.
Digital outputs	Analyzer on, online fault alarm, no sample flow 1 and 2, low reagent level alarm, calibration error, validation error, result alarm, etc.
Analog outputs	2 analog outputs, 4–20 mA
Serial interface RS232	MODBUS Protocol
Data logger	For alarms and results, integrated with USB download function

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Subject to change
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