

Water analysis technology

Precise, reliable,
connected

CUTTING-EDGE SENSORS FOR
WATER ANALYSIS APPLICATIONS



Monitoring and improving water quality is crucial for numerous applications in water treatment, wastewater treatment, industrial process control and environmental monitoring. Sensors play an important role and enable precise, continuous and reliable monitoring of water quality. The following applications are examples of waste water monitoring and waste gas cleaning in chemical production plants.

Reverse osmosis systems

Proven technology CONDIX and MULTICON-H

Reverse osmosis describes a process by which unwanted substances dissolved in a liquid are reduced to a tolerable level using pressure and permeation. As described here, a reverse osmosis system is used to treat landfill leachate so that it can be discharged directly into the environment in compliance with the respective threshold values. The water is separated in two stages by reversing the osmosis effect using semi-permeable membranes to retain unwanted particles and substances from the purified clear water fraction (permeate). During the multi-stage separation process, the conductivity and pH value of the process water, as well as the operating pressure and flow rate, are monitored.

3D visualization of a reverse osmosis system on landfill leachate in container format.



Conductivity is the key parameter of the reverse osmosis system, which is used to determine the ion concentration and thus the level of contamination. The conductivity value is used in the reverse osmosis process to determine the quality of the raw water, monitor the cleaning performance and control the cleaning phase. Excessive conductivity in the raw water at the process input can damage the system and cause it to shut down. The permeate as the output product after the 2-stage purification typically has a conductivity of approx. 100 $\mu\text{S}/\text{cm}$. The analytical sensors in the system are subject to process pressures of 2–16 bar, and are mounted using screw threads in stainless steel fittings. The process signals are recorded in the container and transmitted via PROFINET® field bus.

Process pressures of 2–16 bar prevail in the area of the analytical sensors. The sensors are mounted using screw threads in stainless steel fittings. The process signals are recorded in the container and forwarded to the programmable logic controller via a PROFINET® field bus. The process data is visualized in the control room at a higher level.

Senseca's CONDIX digital conductivity transmitter and MULTICON-H multi-channel controller, which can integrate up to six sensors into one system or plant, help to ensure a smooth process. During the filtration process and during the discharge of the permeate from the system, the CONDIX transmitter continuously provides the conductivity value of the process water, that is used to adjust the operating parameters if necessary. These process and quality-relevant measurement results are made available throughout the entire process chain via the MULTICON-H, which is connected to the CONDIX and PHIX via RS485 (MODBUS RTU). Flow sensors can be connected directly to the MULTICON-H.

The display on the MULTICON-H is easy to read in both dark environments and in sunlight. Both the total and current volume flow value are displayed for optimal control.

As a result, the system material is protected against unwanted deposits, thus reducing the need for cleaning. It also has a positive effect on productivity by reducing downtime.



A view into the container, showing the semi-permeable membranes of the reverse osmosis system.

For gas scrubbers - efficient control and measurement

A gas scrubber, also known as a scrubber, is a device used to clean exhaust gases from industrial processes by removing harmful particles and gases. Contaminated gas is fed into the scrubber, where it comes into contact with a scrubbing liquid. This absorbs or reacts with the pollutants in the gas. After the reaction or absorption, the liquid droplets containing the pollutants are removed in the mist eliminator. The cleaned gas is discharged from the scrubber and can then be released safely into the environment.

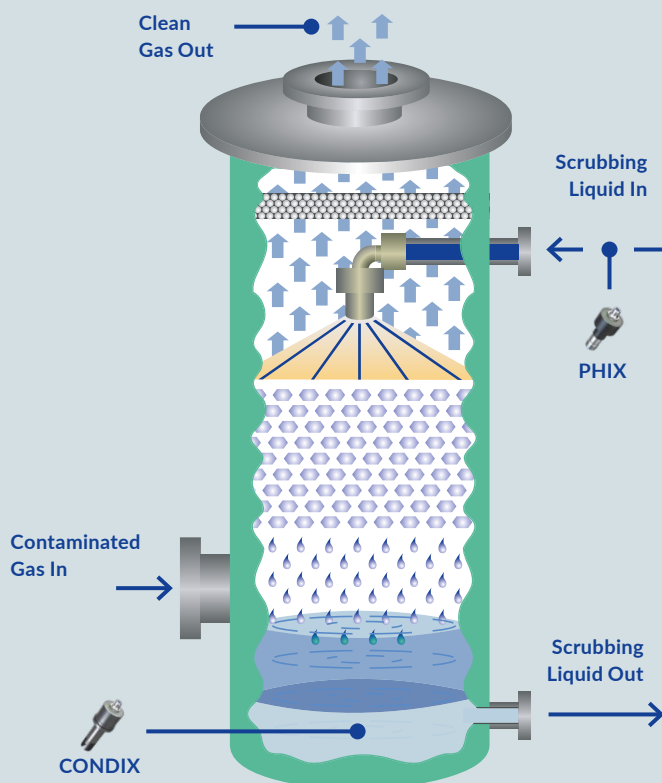


Chemical gas scrubber

Precise water analysis for eco-friendly monitoring

pH sensors measure the acidity or alkalinity of the scrubbing liquid and are used to control (dose) chemical additives to the desired setpoint. **Conductivity sensors** monitor the concentration of ions in the **liquid reservoir** to control blowdown processes.

Combining CONDIX and PHIX at critical points enables scrubbers to be operated efficiently. liquid reservoir, in the drains for contaminated liquids and in the scrubbing liquid inlet. By combining CONDIX and PHIX at critical points, gas scrubbers can operate more efficiently and improve the quality of the scrubbing liquid by continuously monitoring and controlling it. This ensures ongoing compliance with environmental standards.



Gas scrubber (schematic representation)

CONDIX

High measurement accuracy and reliability



Predictive maintenance for minimal downtime

The digital conductivity transmitter CONDIX provides precise and reliable conductivity measurements, minimizes measurement deviations and offers Industry 4.0 functions that are useful for intelligent self-diagnosis, efficient maintenance, less downtime and more sensor life. By integrating the converting electronics and implementing the digital Modbus interface, the sensor not only provides the measured variables of conductivity and temperature but also information about its status, such as the internal sensor voltage and other device parameters. The data transmission from the CONDIX converter enables an immediate response to process changes.

PHIX

Precision and predictive calibration



Increased signal reliability and reduced wiring effort

The pH/redox (ORP) transmitter PHIX provides precise and reliable pH measurements. Measurement errors are minimized and stable and consistent results are ensured. The universal Modbus interface allows integration into modern process control systems and enables remote monitoring and control, reducing maintenance requirements and increasing operational efficiency. The PHIX transmitter has an automatic calibration function that greatly simplifies the process. In practice, the user simply has to dip the pH electrode into the calibration solutions and the transmitter automatically makes the necessary adjustments.

MULTICON-H

Comfort for control and monitoring



Cost-effective to install, maintain and operate with IIoT integration

The MULTICON-H multi-channel controller is a multifunctional measurement and control device that offers a variety of advantages that make it an excellent choice for industrial applications. Thanks to its versatility, it enables centralized monitoring and control of up to 6 different measured variables. PROFINET® networking allows data to be transmitted and recorded from the CONDIX or PHIX, allowing a direct response to changes in state. A major advantage of Profinet is that all connected sensors can be conveniently integrated into the PLC program using the device description file (GSDML). The interface also allows for convenient configuration and calibration of the transmitters.

