



Emerson Liquid Analytical Solutions

Rosemount™ Liquid Analytical Solutions
Whatever your liquid process challenge, let Emerson provide the solution.



UNMATCHED ACCURACY. SUPERIOR PERFORMANCE. WORRY-FREE DEPENDABILITY.

Our leading-edge instruments and applications expertise, along with unmatched customer service and support worldwide, put Emerson's Rosemount™ instruments in a league of their own. We help our customers maximize process performance, productivity, and profitability. Our solutions can provide reduced installation and maintenance costs while improving process quality. We offer a complete range of analyzers, transmitters, and sensors for the continuous online measurement of pH, ORP, conductivity, dissolved oxygen, ozone, chlorine, and turbidity. All around the world, Rosemount analytical products from Emerson prove their worth to thousands of customers every day.

Emerson is a global company that brings together technology and engineering to provide innovative solutions for our customers in a wide range of industrial, commercial, and consumer markets. Our priority is to design, produce, and deliver products, systems, and solutions that make people's lives better.



The New Standard in Performance

Value Analysis and Value Engineering (VA/VE) assure the quality of both our products and their value to our customers. Plant and personnel safety are of prime importance in the design and manufacture of our products.

Our products are approved by organizations known worldwide: Factory Mutual (FM), Canadian Standards Association (CSA), and European (ATEX) for Electrical Equipment in hazardous locations. For increased EMI and RFI protection and safety, our global product line has been certified to meet CE standards and specifications. Adherence to these high standards assures our customers that they are getting the safest, most reliable products.

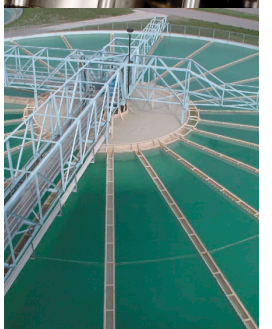
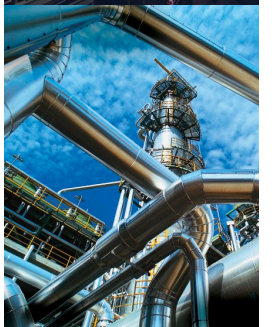
Cutting - Edge Liquid Analytic Solutions For **Your** Applications

Proven Highest Quality Analysis

Emerson's design manufacturing and quality assurance programs are fully documented and certified to ISO-9001 quality standards.

100% factory testing provides virtually trouble-free start-up and increased product life.

Through support, product knowledge, and commitment, Emerson assures a consistent approach to reliable quality.



Power Generation

To generate power, a steam electric power plant needs to supply high-purity, super-heated steam to the turbines that power the electric generators. The goal of plant chemical control is minimizing waterside and steamside corrosion to prevent solids from building up in the heat exchanger and boiler tubes.

Corrosion and deposition cost the power industry billions of dollars every year in reduced efficiency and equipment failures! Good water chemistry can help to reduce those costs through accurate, continuous analysis.

Solutions

pH Measurement

- FGA scrubbers and cooling water
- Monitoring of condensate, feedwater, boiler water, and steam

Conductivity Measurement

- Monitoring of reverse osmosis and ion exchange demineralizers
- Concentration of regeneration chemicals
- Cation and degassed cation conductivity in condensate (Larson-Lane System)
- Monitoring of the steam/water cycle

Dissolved Oxygen Measurement (ppb)

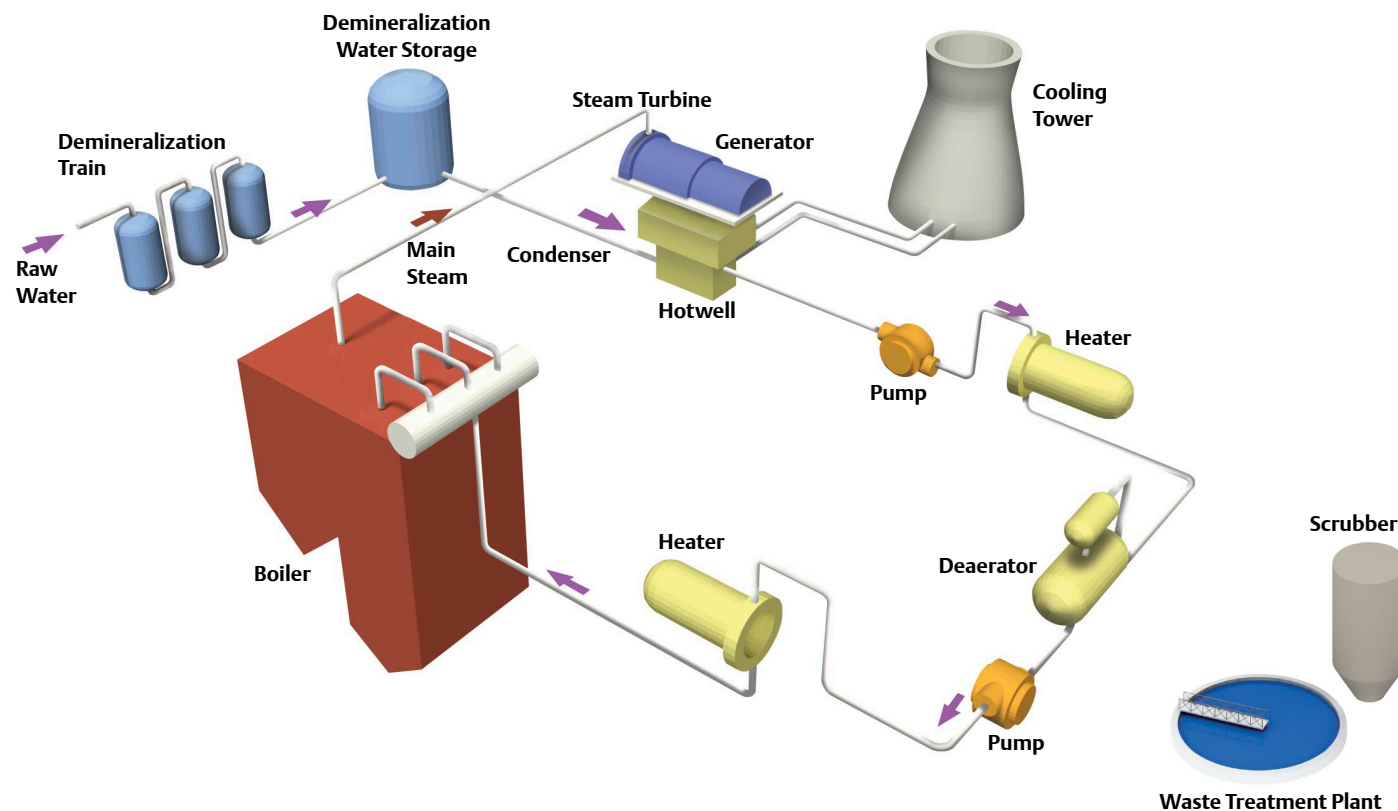
- Monitoring of condensate and boiler feedwater



Rosemount 56 Transmitter



Rosemount 3900 pH Sensor



Drinking Water Treatment

A drinking water plant takes raw water from a lake, river, or well and treats it to kill or deactivate harmful microorganisms.

Continuous analyzers monitor the process. Turbidimeters measure water clarity, which is a good indicator of filter performance. Free chlorine, chloramine, or total chlorine sensors measure disinfection residuals, allowing in plant operators to calculate the CT values used to measure disinfection effectiveness. Chlorine or ozone sensors monitor primary disinfectant levels. pH sensors measure the acidic or basic nature of the water, which is important in the CT calculation. pH also gives an indirect indication of the corrosiveness of the product water.

Solutions

pH Measurement

- Effluent pH monitoring

Chlorine Measurement

- Monitoring free chlorine, chlorine, and monochloramine in drinking water



Rosemount 56 Transmitter



Rosemount Clarity II Turbidity System



Rosemount 3900 pH Sensor



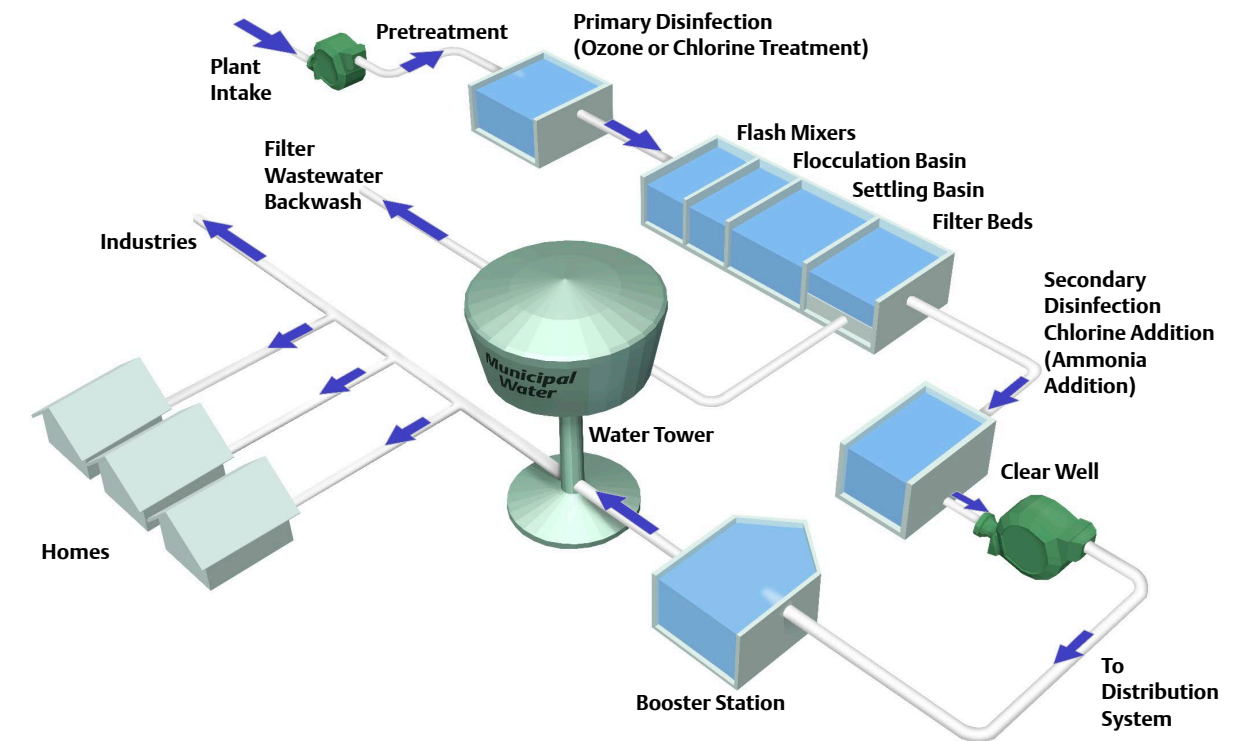
Rosemount 499 AOZ Sensor

Ozone Measurement

- Monitoring and controlling ozone for primary disinfection

Turbidity Measurement

- Monitoring clarifier and filter effluents



Wastewater Treatment

Wastewater is generated by homes, businesses, and industries and is treated in two major steps, primary and secondary treatment, with disposal of solids during both steps. Analytical measurements such as pH and ORP are performed during the primary treatment stage in order to monitor the removal of solids from the wastewater.

Secondary treatment relies upon biological process to further purify the wastewater, and maintaining proper dissolved oxygen (DO) levels are critical to this process. The Rosemount™ 499ADO Dissolved Oxygen Sensor is the perfect choice for maintaining the proper amount of oxygen required by microorganisms during biological processes.

Final treatment consists of chlorination and dechlorination and uses the Rosemount 499 ACL Free Chlorine Sensor. The final effluent is monitored for compliance and reporting purposes, and can include pH, turbidity, and chlorine measurements.

Solutions

pH Measurement

- Effluent pH monitoring

Chlorine Measurement

- Monitoring chlorine in final treatment

Dissolved Oxygen Measurement

- Monitoring and controlling oxygen in activated sludge process

Conductivity Measurement

- Monitoring conductivity at influent and outfall

Turbidity Measurement

- Monitoring of portable water and wastewater

Total Suspended Solids

- Monitoring suspended solids and sludge control



Rosemount 56 Transmitter



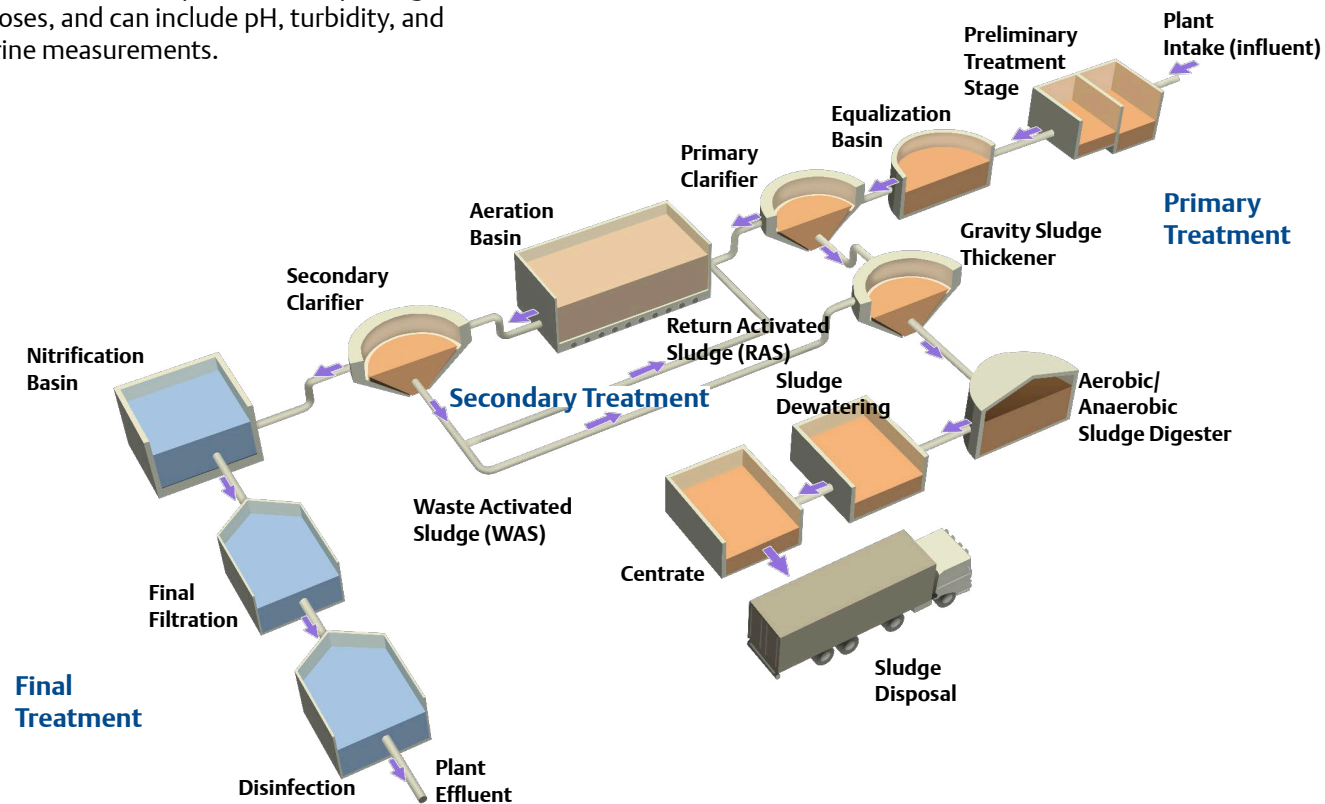
Rosemount 499A DO Dissolved Oxygen Sensor



Rosemount PERpH-X pH Sensor



Rosemount TUpH pH Sensor



Metals + Mining

The Mining industry requires robust equipment for reliability in mining process. Sensors are designed for these difficult processes and provide measurements of pH, ORP, and conductivity that are specifically designed for long life and reliable results in high solids applications. Featured products for this industry include the Rosemount™ 242 Flow Through Conductivity Sensor, the coating resistant Rosemount 396P TUpH pH sensor, and the high performance Rosemount PERpH-X 3500 pH sensor. These sensors work well with the easy to use dual channel Rosemount 1056 analyzer for ease-of-use, reduced maintenance, troubleshooting, and training costs.

Solutions

pH Measurement

- Cyanide-based extraction
- Flotation for copper sulfide separation
- Minimize waste products

Conductivity Measurement

- Phase difference for product concentration
- Steel impurities removal
- Tailing discharge monitoring



Rosemount PERpH-X pH Sensor



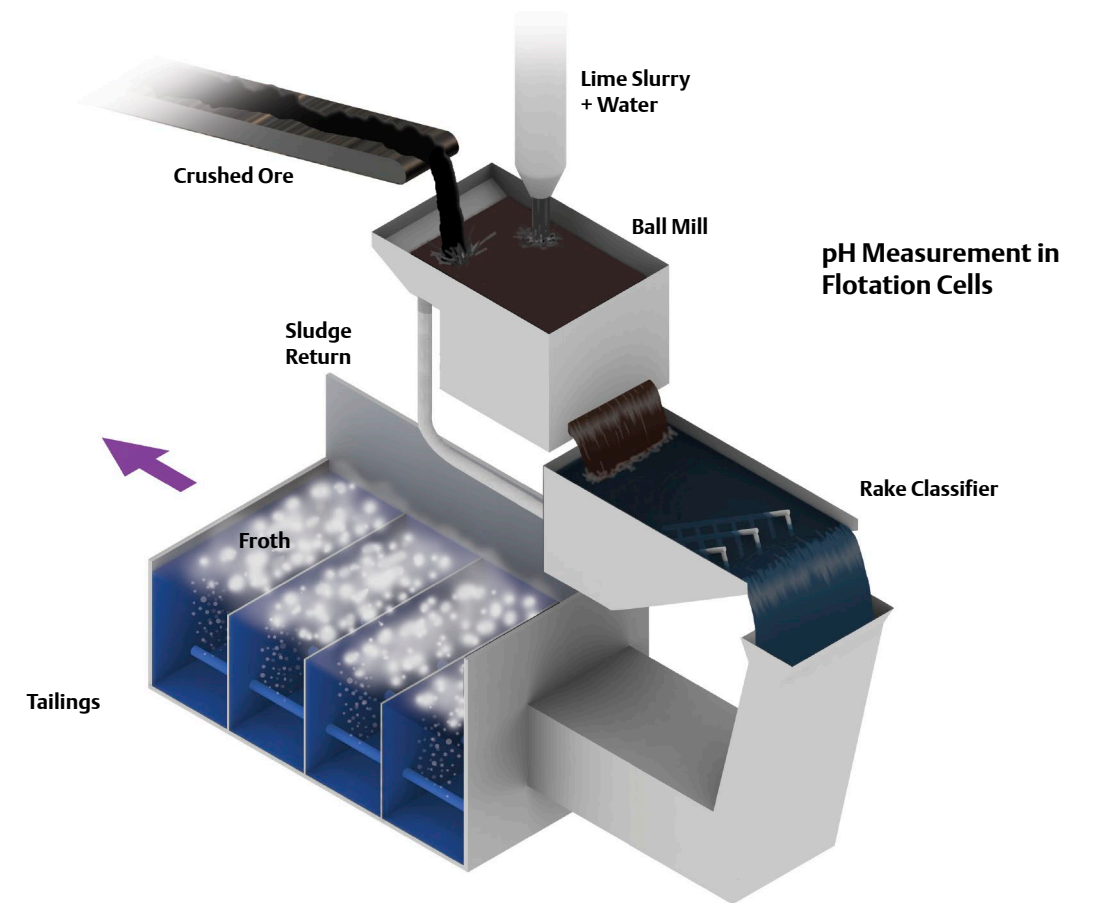
Rosemount 242 Flow Through Conductivity Sensor



Rosemount 56 Dual Channel Transmitter



Rosemount 5081 Transmitter



Paper Production

There are many processing steps used to turn wood into paper products. In chemical pulping, strong liquors are used to delignify the wood chips, and the spent liquors are constantly being collected and regenerated. Conductivity measurement is used to monitor the strength of these liquors and control the pulping process. The pulp slurry undergoes bleaching, blending, and refining prior to being run in the paper machine. pH control during these stages is essential for consistent quality. Emerson's pH and conductivity devices are used in these challenging applications to obtain these benefits with a minimum of routine maintenance.

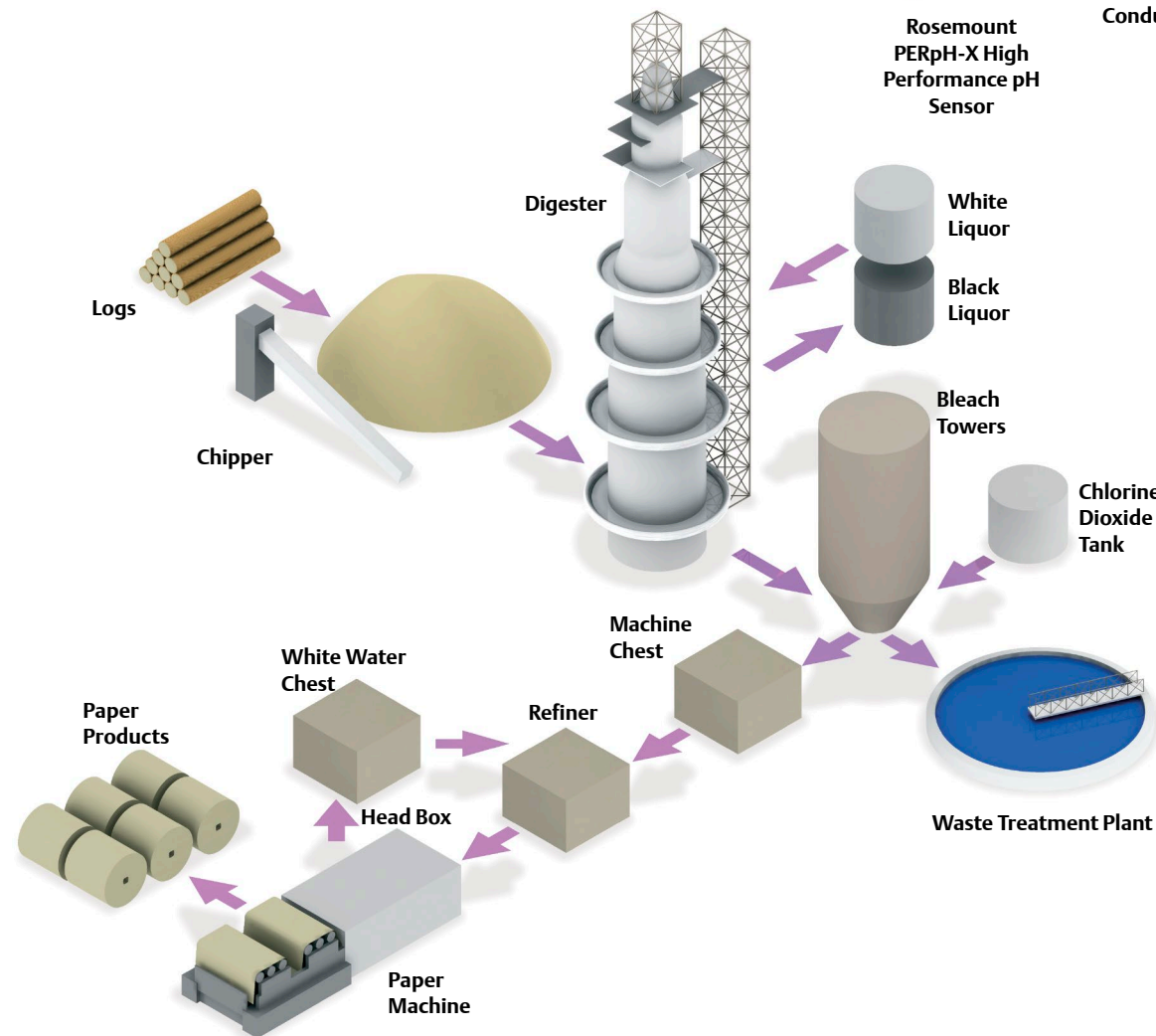
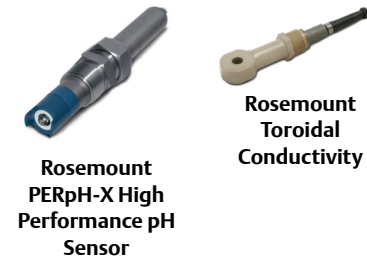
Solutions

pH Measurement

- Control of the wet end of the paper machine
- ClO₂ bleach lines
- pH measurement in the head box
- General pulp stock pH measurements

Conductivity Measurement

- Alkali concentration monitoring in kraft white liquor and weak white liquor
- Brown stock filtrate monitoring
- Pulp digestion in the kraft process



Pharmaceutical Production

Conductivity is a critical measurement for water-for-injection (WFI). Conductivity measurements must adhere to the latest USP guidelines. Sensors need to be calibrated to NIST standards and have surface finishes < 16 Ra.

The Rosemount™ 403 Conductivity Sensor meets these guidelines. Conductivity transmitters must provide alarms of raw, uncompensated conductivity based on the water temperature. The Rosemount 56 Dual Channel Transmitter has the latest USP tables programmed into it, listing acceptable conductivity level vs. temperature.

Dissolved Oxygen and pH are two critical measurements in the bioreactor. These tight control parameters affect product yields and speed of reaction. In addition, these sensors must withstand steam-in-place (SIP) cleaning since residual buffer solutions may affect the drug harvest campaign. The Rosemount Hx338 pH sensor and the 499 ADO Dissolved Oxygen sensor withstand frequent SIP cleaning cycles, providing highly accurate measurements with fast response times.

Solutions

pH Measurement

- Steam sterilizable pH measurement

Conductivity Measurement

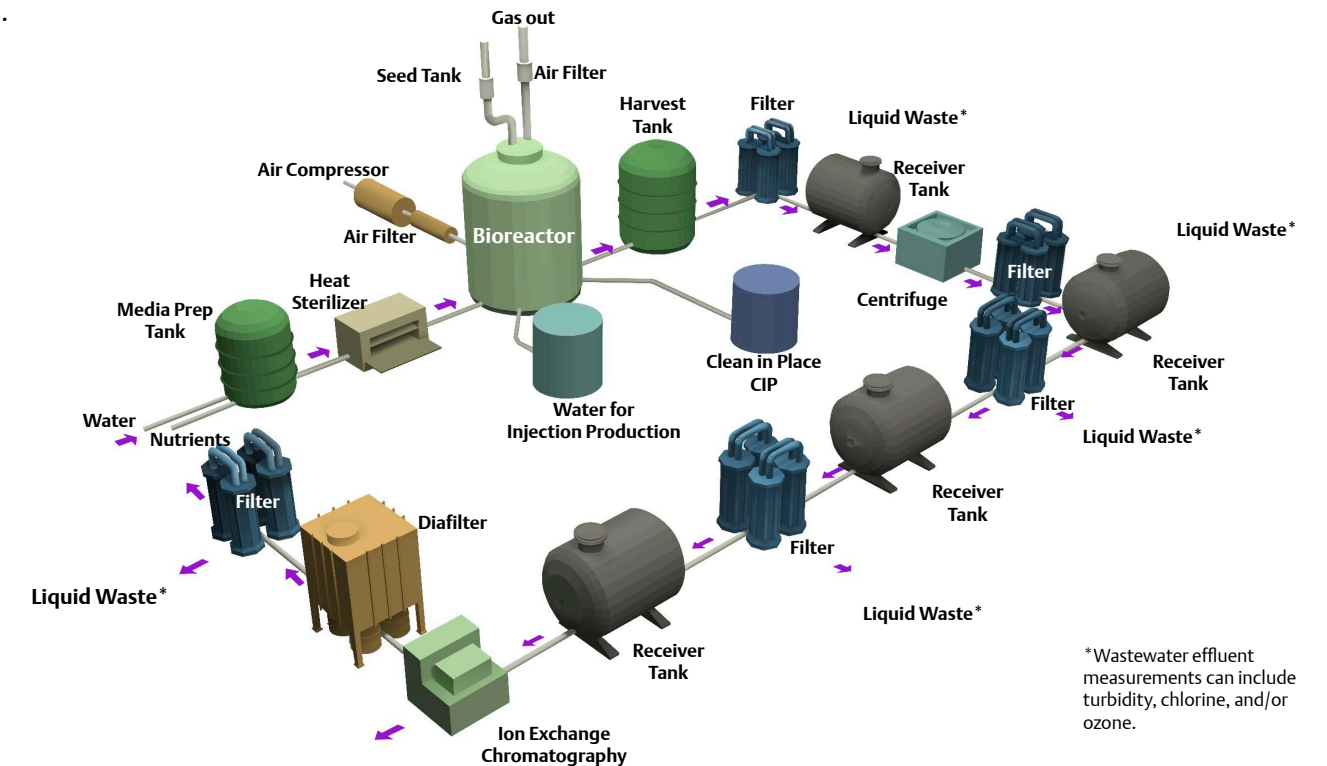
- Clean-in-place (CIP) monitoring and control
- Complete monitoring of water purification systems for water-for-injection (WFI) systems

Dissolved Oxygen Measurement

- Steam sterilizable dissolved oxygen measurement

Ozone and Chlorine Measurement

- Monitoring of disinfection and sanitization processes



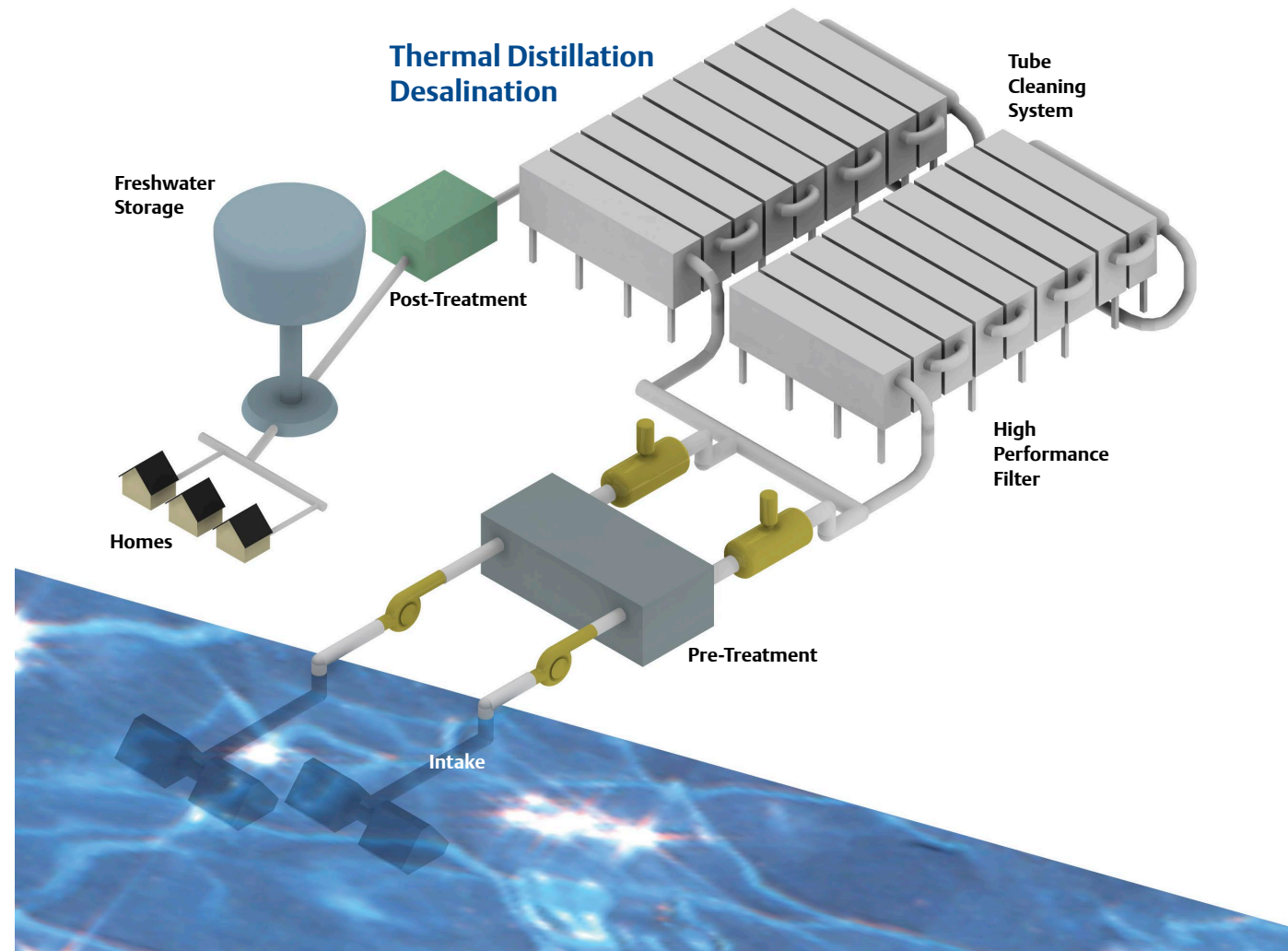
*Wastewater effluent measurements can include turbidity, chlorine, and/or ozone.

Desalination

As world potable water supplies become more scarce, utilities and governments are increasingly turning to desalination of ocean and brackish water to meet growing demand.

There are two basic desalination technologies: thermal distillation and membrane separation (reverse osmosis). Both methods extract fresh water from the salty water source, leaving behind even saltier wastewater. Pretreatment of the raw water to control scaling and fouling and, in the case of thermal distillation, to control corrosion is an important part of the desalination process.

Conductivity is an important process measurement in a desalination plant. Emerson's conductivity sensors are reliable, long lasting, and provide continuous measurement of the dissolved salts concentration in the product water. Other measurements are pH, chlorine, and turbidity. Chlorine and turbidity are used primarily to check that the product water meets local public health standards.



Solutions

Conductivity Measurement

- Product water quality
- Raw water, permeate, and reject in reverse osmosis
- Raw water, condensate, and brine discharge in thermal methods

Turbidity Measurement

- Product water quality

pH Measurement

- Product water quality
- Raw water after pretreatment

Chlorine Measurement

- Product water quality
- Dechlorination of RO feedwater



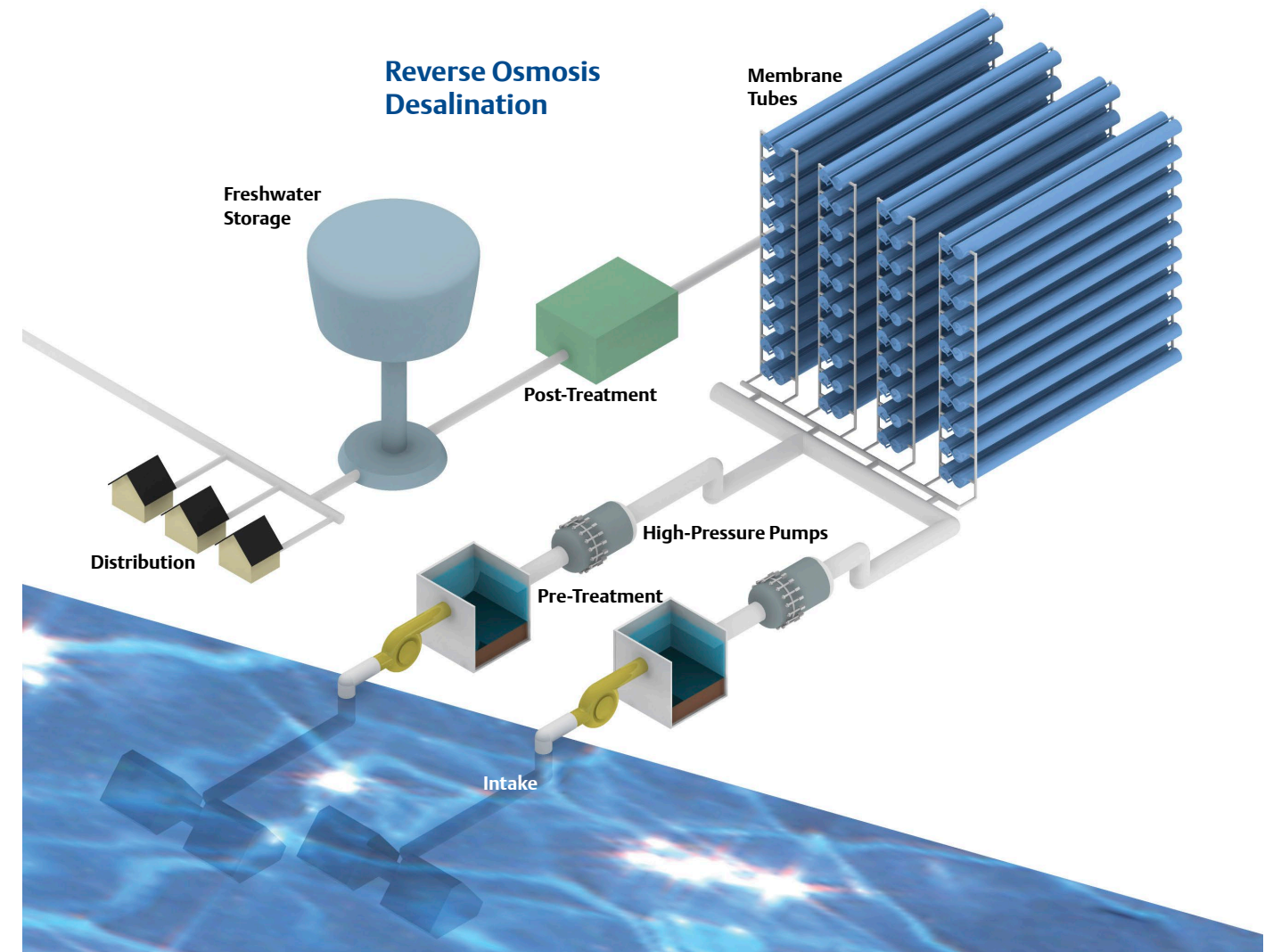
Rosemount 56 Dual Channel Transmitter



Rosemount PERpH-X pH Sensor



Rosemount 400 Conductivity Sensor

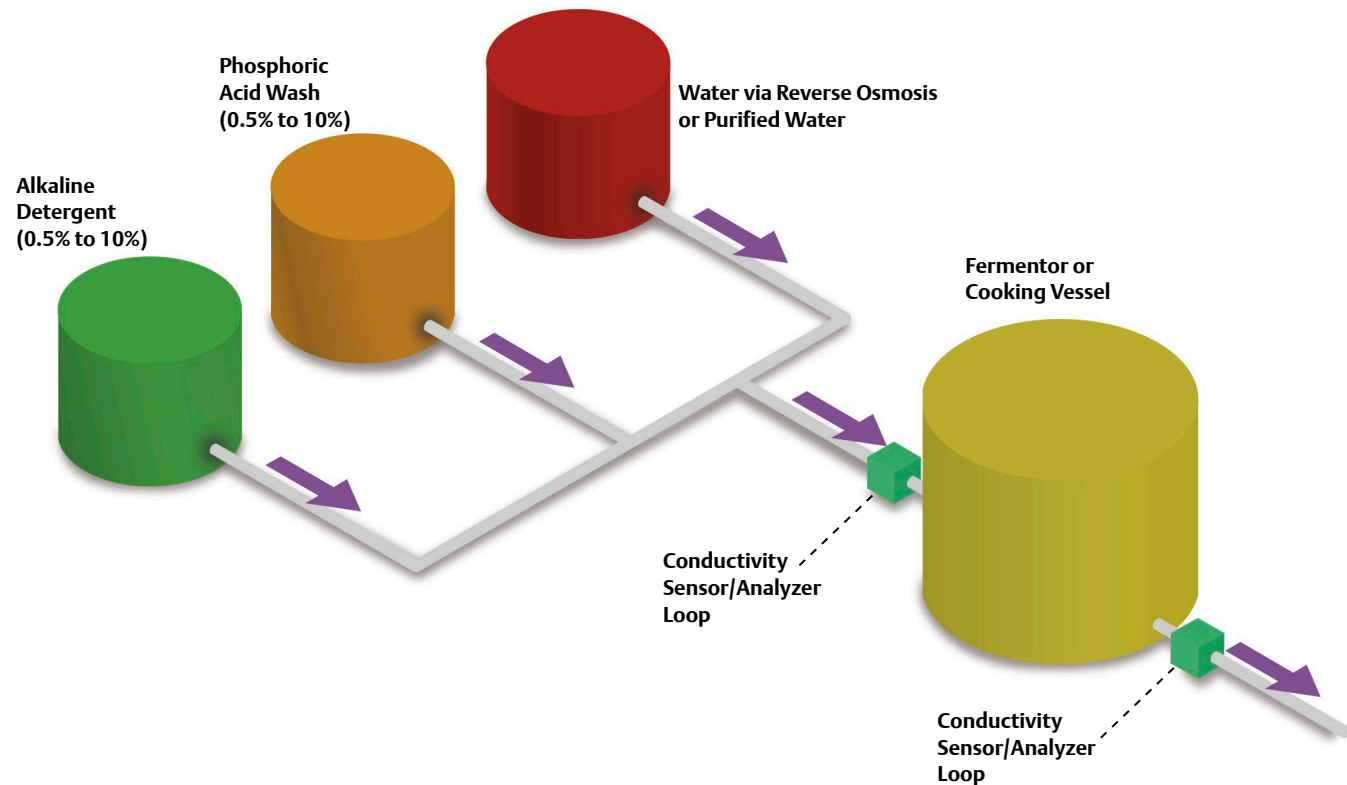


Food + Beverage Production

Process piping and vessels used in the food and beverage industries require periodic cleaning without disassembly (clean-in-place – CIP) to remove residue from previous batches and to sanitize both the process piping and vessels. The various cleaning solutions used are more conductive than the water used for flushing and final rinsing. Conductivity can be used to monitor the various cleaning steps and the final rinse.

The cleaning solutions used for CIP are used for several cleanings. Conductivity can often be used to monitor the strength of the cleaning solutions to indicate the need for replenishment.

One of the major requirements for sensors used in CIP applications is that they be sanitary in design. The Rosemount™ 245 Sanitary Flow Through Toroidal Conductivity Sensor mounts directly into the cleaning lines via Tri Clamp flanges.



Solutions

pH Measurement

- Steam sterilizable pH measurement

Conductivity Measurement

- Clean-in-place (CIP) monitoring and control
- Complete monitoring of water purification systems for water-for-injection (WFI) systems

Dissolved Oxygen Measurement

- Steam sterilizable dissolved oxygen measurement

Ozone and Chlorine Measurement

- Monitoring of disinfection and sanitization processes



Rosemount 1066 Analyzer



Rosemount Hx338 pH sensor



Rosemount 245 Sanitary Flow Through Toroidal Conductivity Sensor

Chemical Processing



Rosemount PERpH-X pH Sensor



Rosemount ENDURANCE Sensors

pH Measurement

- Continuous or batch neutralization of acid/alkaline waste
- Coagulation and flocculation in industrial water treatment
- Scrubber control
- Leak detection for heat exchangers
- Cooling water monitoring

Conductivity Measurement

- Chemical concentration control for acid, base, and salt solutions
- Sulfuric acid production
- Scrubber control
- Interface detection between aqueous and non-aqueous solutions
- Boiler blowdown

Textile Industry



Rosemount 226 Sensors

pH Measurement

- pH monitoring and control in indigo dyeing

Conductivity Measurement

- Caustic concentration control in mercerization
- Sulfuric acid concentration control in wool carbonizing

Oil, Gas, and Petroleum Refining



Rosemount 396 / 398 TUpH pH Sensor



Rosemount 228 Sensors

pH Measurement

- Corrosion control of crude overheated towers
- Monitoring effluent of API separators
- pH control in quench towers
- pH control in sour water strippers

Conductivity Measurement

- Interface monitoring and control in pipes and storage tanks
- Mud logging (226) sensor

Electronics & Semiconductor Industries



Rosemount 400 Sensors

Resistivity Measurement

- Monitoring ultra-pure water
- Monitoring and control of rinsing processes

Complete solutions from Emerson

Emerson's advanced analyzers incorporate both Quantum Cascade Laser (QCL) and Tunable Diode Laser (TDL) technology to deliver the most sophisticated industrial gas sensing, analysis, and emission monitoring solutions. The analyzers improve productivity, ensure quality, and provide faster insight into the process.

Gas Chromatography Solutions

Gas chromatographs are the world leaders in process gas measurement, separating process gas into identifiable components. Our family of chromatographs has a worldwide reputation for accuracy, repeatability, and dependability.



Emerson.com/RosemountGasAnalysis

Process Gas and Combustion Solutions

Emerson supplies combustion analysis and environmental monitoring solutions. With more than 80 years of experience, we go way beyond simple data collection and offer provable analytical solutions, advanced Rosemount analytical instrumentation and professionals who really know how to keep you up and running efficiently, safely and economically.



Emerson.com/RosemountGasAnalysis

Industrial Hazard Safety

Fixed toxic and combustible gas detection flame detectors and specialized safety and security products are designed for harsh, industrial environments. Strict quality standards and engineering practices are followed and all products are certified to the strictest global standards for safety performance.



Emerson.com/RosemountFlameGasDetection

Industrial pH and ORP Sensors

Rosemount™ industrial pH sensors from Emerson are designed to meet the demanding process needs of a wide range of industries including pulp and paper, hydrocarbon processing, refining, chemical, life science, and food and beverage. Emerson sets the industry standard by offering flexible solutions for a variety of applications ranging from low to very high temperatures, non-coating to fouling applications, and processes with cyclic CIP.



PERpH-X High Performance pH and ORP sensors

The Rosemount PERpH-X™ sensor family was designed with a rugged, molded Ryton® body to expand application flexibility by withstanding elevated temperatures up to 311 °F (155 °C).

These sensors feature several design innovations that increase sensor life in difficult applications, including durability of the AccuGlass™ pH glass electrode, stability of the reference electrode, and an enhanced mechanical design. PERpH-X technology uses a rebuildable concept and is offered with six electrolyte fill solutions to match the process chemistry. The resulting sensors live longer, respond faster, and drift less, thereby minimizing maintenance and lowering cost of ownership.

Rosemount PERpH-X high performance pH sensors feature AccuGlass pH glass electrodes, which provide exceptional resistance to thermal degradation, even at temperatures around 311 °F (155 °C). This means less breakage from thermal shock and improved speed of response for fast and accurate calibrations.

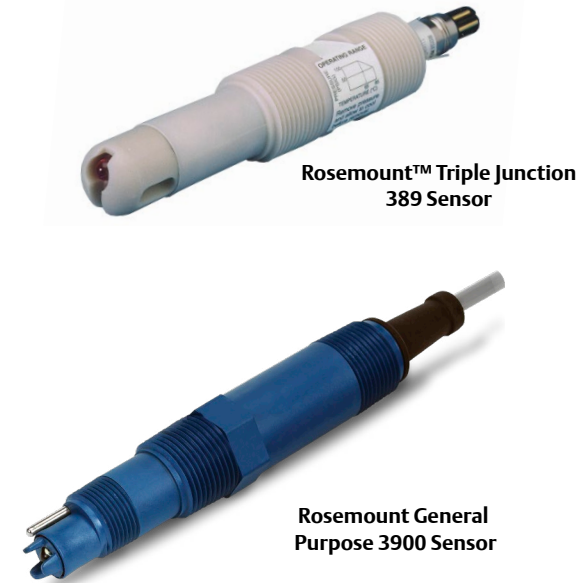
Most pH measurements fail due to reference electrode problems, fouled electrolytes, or clogged reference junctions. The double junction design has a replaceable porous Teflon® liquid junction that resists coating in dirty applications. The rechargeable KCl gel resists fouling. Replacing a clogged junction or recharging the electrolyte will rejuvenate most failed sensors.

With Rosemount PERpH-X™, one sensor can succeed in a variety of processes by using different reference electrolytes. Six different electrolyte Solutions Kits are available:

- > High Temperature Kit
- > Bio-Film Resistant Kit
- > Poisoning Resistant Kit
- > Oil Resistant Kit
- > Scaling Resistant Kit
- > Metals Resistant Kit



Each kit uses a specific chemistry formulated to extend the life of the reference electrode in its targeted application.



General Purpose pH and ORP Sensors

Rosemount general purpose sensors measure the pH or ORP of aqueous solutions in pipelines, open tanks, or ponds. General purpose sensors are suitable for many industrial applications where a low cost, high performance sensor is needed.

General Purpose 3900 and 3900VP

These models feature an annular Teflon junction surrounding the pH/ORP-sensitive membrane.

The double-junction reference cell is resistant to contamination by processes containing ammonia, chlorine, cyanides, sulfides, or other poisoning agents.

Triple Junction Models 389 and 389VP

The combination electrode features a peripheral ceramic junction. The triple-junction reference cell provides longer life in process solutions containing ammonia, chlorine, sulfides, or other poisoning agents.

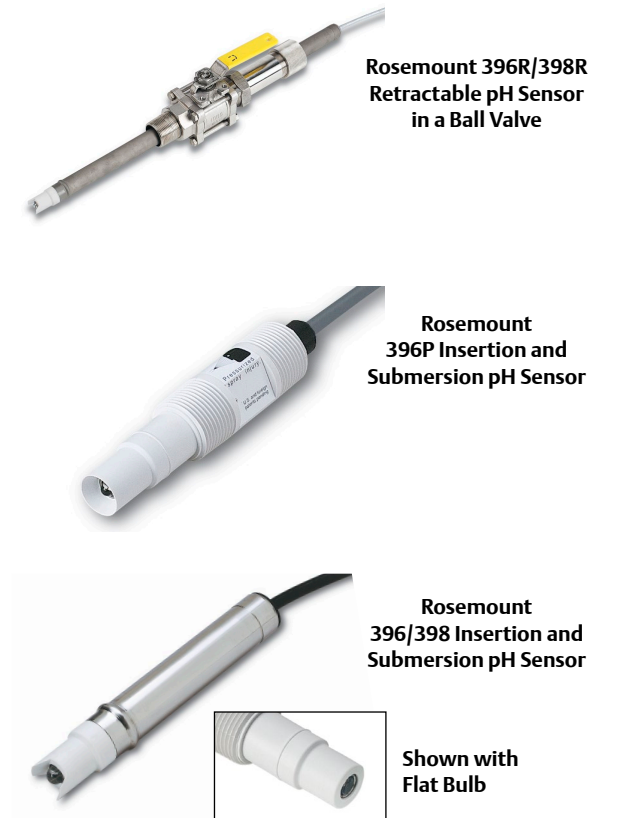
TUpH Family of pH and ORP Sensors

Rosemount TUpH sensors are just that – TOUGH! TUpH sensors feature the industry proven AccuGlass and TUpH reference electrode, designed to resist coating and minimize maintenance. The entire line incorporates three key features: a large surface area TUpH reference junction that resists coating, the Helical Reference Pathway that extends the life in poisoning environments and the SILCORE™ technology that improves the sensors mechanical and temperature durability.

The Rosemount TUpH family of pH/ORP sensors has many configurations designed to meet the needs found in pulp and paper, chemical,

wastewater, and other harsh process applications. The Rosemount 396 is the workhorse of the family, available in valve retractable design, a high pressure insertion design, and a polypropylene bodied insertion/submersion device with front and rear facing 1-in. MNPT threads. A non-glass pH electrode, Rosemount TF396, is also available. The Rosemount 398 offers improved chemical resistance for extended service in the harshest environments.

The optional Variopol connector is designed with a robust, corrosion-resistant metal casing and gold-plated contacts to shield and assure a stable signal. All VP models use a mating watertight VP cable.



Specialty Sensors

Rosemount™ speciality sensors from Emerson are specifically designed to meet the special needs of a wide range of industries including biopharmaceutical, food processing, chemical, power, and semiconductor.



Rosemount™ Hx338+ Steam Sterilizable pH Sensor

In pharmaceutical, food, and beverage clean-in-place and steam-in-place applications, most pH sensors are susceptible to cross contamination between product batches due to old product being held in its reference junction. During cleaning cycles and normal production, intense temperature and pressure swings can cause old product to leach out and put cleaning and sanitization processes at risk, resulting in waste and rework.

The Rosemount Hx338+ pH Sensor utilizes a pre-pressurized pH reference designed to prevent process fluid from entering the sensor, eliminating cross-contamination, ensuring the highest quality product, and minimizing waste.

The durable reference design features a triple-barrier junction to maintain a drift-free pH signal and fight poisoning ions. Engineered to withstand multiple cleaning cycles, this

sensor provides long-lasting accurate measurement and requires fewer replacements, increasing operational efficiency, and lowering costs.



Rosemount Hx338+ Steam Sterilizable pH Sensor

Rosemount™ RBI pH/ORP Sensor

In the chemical, mining, and pulp and paper environments, pH sensors are pushed to the limits with exposure to high temperatures and harsh chemicals. These chemicals can poison and corrupt the pH reference system, leading to inaccuracies and frequent replacement of inoperable sensors.

The Rosemount RBI pH Sensor utilizes a unique, multilayered reference junction that protects the pH reference from poisoning chemicals. This special reference allows the sensor to last for months compared to other sensors that last for only days or weeks.

In addition, the new Variopol (VP) quick disconnect feature greatly minimizes replacement time, reducing pH measurement downtime in harsh, demanding applications.



Rosemount RBI pH/ORP Sensor



Rosemount TF396 pH Sensor

Rosemount TF396

The ion-selective field effect transistor (ISFET) pH electrode provides a stable pH measurement. Its rate of response can be 10 times faster than glass electrodes, enabling better process control. Its short response time and increased stability at low temperatures make it suitable for use in cold processes like brine or water for cooling. Aging effects caused by temperature fluctuations or large changes of process pH are greatly reduced, providing longer intervals between calibration and maintenance of the sensor.

Because there is no glass bulb, the Rosemount TF396 can be used in many applications that restrict or prohibit pH glass electrodes due to the risk of broken glass getting into the process. It may also provide longer sensor life in processes that will break or crack pH glass bulbs. By allowing direct installation into the process, costs for laboratory analysis of sample lines are greatly reduced.

The TUpH Reference technology includes a large area reference junction for minimum



Rosemount 372HF Resistant pH Sensor

Rosemount 372HF Resistant pH Sensor

maintenance requirements. The TUpH reference electrode junction (the entire plastic tip surrounding the ISFET electrode) maintains a steady reference signal, even in dirty applications, by resisting plugging (a common cause of pH signal drift).

Rosemount 372HF Resistant pH Sensor

Exposure to hydrofluoric acid can accelerate the dissolution process of a thin glass membrane, causing the electrodes to become very fragile and prone to breakage.

Enhanced resistance to this process attack is provided by field-proven pH glass formulation in the HF pH sensor. Extended sensor life is provided by double junction reference cell for process solutions that contain poisoning ions.

Multiple mounting options are accommodated by one-piece construction with process threads in two places. Superior chemical resistance is due to rugged Ultem (polyetherimide) body, completely sealed to eliminate sensor leakage.



Rosemount Bx438 Dissolved Oxygen Sensor

Rosemount Retractable Sensor Mounting Assembly

Designed to be used with Rosemount steam sterilizable pH and DO sensors, the assembly is built to withstand clean-in-place cycles. The sensor can be withdrawn without interrupting the process. An integral safety mechanism prevents the assembly from being inserted into the process without the electrode being installed. While in the retracted position, the sensor can be cleaned with water or buffer solutions. The retractable assembly is manufactured with 316 Stainless Steel and FDA approved EPDM O-rings.



Rosemount Retractable Sensor Mounting Assembly

Industrial and Municipal Applications

Conductivity Sensors

Emerson's wide selection of stable and accurate conductivity sensors includes toroidal, contacting and four-electrode.

- > ENDURANCE™ sensors are suitable for the conductivity measurement of ultra-pure water to cooling water.
- > Toroidal sensors are used in corrosive liquids and in liquids containing suspended solids.
- > PUR-Sense™ four-electrode conductivity sensor monitors CIP applications for food and beverage industries.

Conductivity measurements are widely used in industry.

- In water treatment applications, conductivity sensors measure the total concentration of ions and monitor demineralizer performance.
- Conductivity is used to monitor the buildup of dissolved ionic solids in evaporative cooling water systems and in boilers.
- Measuring conductivity in the outlet of a heat exchanger or in the condenser hot well is an easy way of detecting leaks.
- In the pharmaceutical and foods industries, conductivity is used to monitor both the concentration of the CIP solution and the completeness of the rinse.



Rosemount™ ENDURANCE Conductivity Sensors

Emerson offers a wide selection of Rosemount conductivity sensors. The ENDURANCE sensors have titanium electrodes, providing stability and ruggedness without sacrificing accuracy.

Available in 0.01, 0.1, and 1.0/cm cell constants, ENDURANCE sensors are suitable for the measurement of conductivity in samples ranging from ultra-pure water to cooling water.

Process connections include screw-in (400), retractable (402), and sanitary flange (403). All wetted plastics and elastomers in the 403 sensor comply with 21CFR177, and all wetted surfaces have a 16 micron-inch Ra finish. The 404 fast response sensor combines the electrodes and flow cell in a single body.



Rosemount 400 Contacting Conductivity Sensor

Our 400, 402, and 403 sensors are available with Variopol quick connect fittings that feature a tight, corrosion-resistant connection. To replace the sensor, simply unplug the old and plug in the new with no need to rewire the cable. ENDURANCE conductivity sensors can be used with Rosemount 1056, 56,5081-C and 1066-C transmitters.

Four-electrode Sensors

The broad dynamic range—six orders of magnitude – makes the four-electrode Rosemount 410 VP sensor ideal for monitoring CIP (clean-in-place) applications in the food and beverage industries. The sensor is available in PEEK and meets the food contact requirements of 21CFR171. The 410 VP sensor is available with Tri Clamp, Varivent N, and G1 ¼ fittings.



Rosemount™ 410VP Conductivity Sensor



Rosemount 226 and 228 Submersion/Insertion Sensors

Rosemount™ Toroidal Conductivity Sensors

Emerson offers a full line of Rosemount toroidal (inductive) conductivity sensors. Toroidal sensors are ideal for use in corrosive liquids and in liquids containing suspended solids – applications for which metal electrode sensors are not suitable.

For applications where the sensor can be inserted into the process piping or submerged in a tank, choose either the Rosemount 226 or 228 Sensor. The rugged design and construction of these sensors enable them to tolerate the harshest conditions.

The Rosemount 228 is a work-horse sensor and meets most process requirements. However, if high levels of suspended solids are present, the 226 sensor can be a better choice. The large opening in the 226 sensor



Rosemount 225 CIP Sensor

resists plugging from solids better than the smaller opening of the 228 sensor.

Both the Rosemount 226 and 228 sensors are molded from durable, chemical resistant PEEK. The 228 sensor is also available in Tefzel®.

A variety of mounting options are available, and a high pressure retraction device allows the 228 sensor to be inserted against pressure as high as 295 psig (2135 kPa abs).

For applications in the pharmaceutical and food and beverage industries where a sanitary design is required, choose the 225 sensor. The sensor is available in glass-filled PEEK unfilled PEEK, and unfilled Tefzel. The unfilled PEEK sensors conform to 3A sanitary standards, and an unfilled PEEK version molded from USP Class VI polymer is also available. The sensor is available with a 2-inch Tri Clamp process connection.



Rosemount 228 Sensor with Insertion Assembly



Rosemount 222 Sensor Flow-Through Sensors

Emerson also offers flow-through toroidal conductivity sensors. Flow-through sensors are ideal for viscous or fibrous liquids. Because no part of the sensor protrudes into the sample flow, there is no obstruction on which solids can accumulate.

The Rosemount 222 and 242 sensors are intended for industrial applications. The 222 is available in 1- and 2-inch pipe sizes while the 242 accommodates pipes of 1 to 4 inches. A variety of pipe liners and metal contact rings are available.

For flow-through applications in the pharmaceutical and food and beverage industries, choose the Rosemount 245 sensor. The sensor uses Tri Clamp process connections and is available in line sizes between 0.5 and 2-inches.

Toroidal conductivity sensors can be used with 1056, 56, 5081-T and 1066-T transmitters.



Rosemount 242 Flow Through Sensors



Rosemount 245 Flow-Through Toroidal Conductivity Sensor

Application-Specific Sensors

One of the most important measurements in the determination of the health of a body of water is its dissolved oxygen content.

The primary function of dissolved oxygen in a waste stream is to enhance the oxidation process by providing oxygen to aerobic bacteria so they will be able to successfully perform their function of turning organic wastes into their inorganic byproducts.

Amperometric Sensors

Emerson offers a complete line of Rosemount™ amperometric sensors for the determination of dissolved oxygen, ozone, and chlorine in water. These membrane-covered sensors are rugged and easy to maintain. Replacing a membrane requires no special tools, and routine maintenance takes only minutes. Sensors are available with either an integral cable or a Variopol 6.0 connector.

Dissolved Oxygen Sensors

The Rosemount 499A DO sensor accurately measures dissolved oxygen in a variety of applications, particularly municipal wastewater treatment. Calibration is easy.



Rosemount 499ADO Dissolved Oxygen Sensor



Rosemount 499ACL Free Chlorine Sensor

Just expose the sensor to air and press a button. The analyzer measures the barometric pressure and temperature, calculates the solubility of oxygen in water, and calibrates the sensor.

Free Chlorine Sensors

The Rosemount 499ACL-01 sensor effectively measures free chlorine without the expense and maintenance required of reagents and sample conditioning systems. It measures free chlorine samples having pH as high as 9.5. In addition, the analyzer automatically compensates for the effect of pH on the measurement (a separate pH sensor is required). If the pH of the sample varies less than 0.2, pH correction is generally not needed. The linear range of the sensor is 0.10 ppm.



Rosemount Bx438 Dissolved Oxygen Sensor

Rosemount Bx438 Dissolved Oxygen

The Rosemount Bx438 sensor is designed to monitor trace levels of dissolved oxygen in beer and other carbonated beverages. The Bx438 utilizes a robust membrane and is designed to withstand significantly more clean in place (CIP) cycles than other dissolved oxygen sensors.

The design of the membrane is the key to achieving high performance and decreased maintenance. The electrode construction guarantees excellent stability even after numerous sterilization cycles. The cost to maintain the Bx438 sensor is approximately one-third the cost required to maintain competitive dissolved oxygen sensors.



Rosemount™ TCL Total Chlorine Sample Conditioning System

Total Chlorine

The Rosemount TCL is a sample conditioning system, sensor, and analyzer for the determination of total chlorine in water. The system is reagent-based and measures true total chlorine. The reagent, a solution of potassium



Rosemount 499 OZ Sensor

iodide in vinegar, lasts two months. Sample usage is small – about 15 mL per minute.

Monochloramine

The Rosemount 499ACL-03 measures monochloramine in drinking water. Like the Rosemount 499ACL-01 sensor for measuring free chlorine, the monochloramine sensor requires no reagents or sample conditioning systems. The linear range of the sensor is 0–20ppm.

Ozone

Use the Rosemount 499AOZ sensor to measure ozone in a wide variety of processes, including drinking water and bottled water. The sensor easily measures ozone concentrations as high as 1 ppm. For higher levels, such as those used in cleaning and sanitizing, consult the factory.

Trace Dissolved Oxygen

The Rosemount 499A TrDO sensor is the perfect choice for measuring trace dissolved oxygen in boiler feedwater in steam electric power plants. The sensor has a rapid come-down time following maintenance and calibration. High accuracy (± 1 ppb), lack of flow sensitivity, and rapid response time rival more costly sensors on the market.



Rosemount 499A TrDO Sensor



Application-Specific Systems

Chlorine is an important measurement. It is in aqueous solutions and is used for a number of purposes such as disinfection, taste and odor control, bleaching, and as a powerful oxidizing agent in various manufacturing processes.



Rosemount™ FCL Free Chlorine Measuring System

pH Independent Free Chlorine Measuring System

The Rosemount FCL Free Chlorine System is intended for the determination of free chlorine in fresh water. It uses no expensive sample conditioning systems or messy reagents to control pH, nor does it require an auxiliary pH sensor for pH correction.

The Rosemount FCL uses a three-electrode, membrane-covered amperometric sensor and includes an easy-to-use, fully programmable analyzer. The analyzer, flow cell, and flow controller are mounted on a back plate, and sensor cables are pre-wired to the analyzer. To eliminate wiring hassles, quick disconnect Variopol cable is standard. Because the FCL uses a constant head device to control flow, no pressure regulators or valves are needed. Flow requirements are very low – only 2 gph.



Rosemount 56 Dual Channel Transmitter

Packaged Free Chlorine and Monochloramine Systems

Emerson offers a complete line of innovative Rosemount liquid analysis tools. The FCL and MCL are complete systems for the determination of free chlorine and monochloramine in water. The analyzer, flow cells, and flow controller are mounted on a back plate and sensor cables are pre-wired to the analyzer.

Just mount the plate, bring in the sample, provide a drain, connect power, and attach the sensors to the pre-wired Variopol cables. Because the FCL and MCL use a constant head device to control flow, no pressure regulators or valves are needed. Flow requirements are very low – only 3 gph (11 L/hr). And the measurements are completely reagent free.

Turbidity

The Rosemount Clarity II™ T1056 dual-sensor turbidimeter allows water treatment facilities to comply with U.S. EPA and International ISO regulations for measurement of water clarity. The system includes an electronic analyzer, a low-NTU optical sensor, and a measurement chamber with a two-stage debubbler. The turbidimeter meets EPA 180.1 and ISO 7027 specifications for turbidity measurement when installed with the appropriate optical sensor. 4–20 mA analog outputs can be enabled for interfacing to recording devices and control systems. The instrument incorporates an easy-to-use menu-driven user interface for programming, calibration and operation, as well as backlit display. Choose among six languages for even more ease of use and flexibility.



WQS Water Quality System

Water Quality System

The Rosemount WQS Water Quality System is intended for the determination of pH, ORP, conductivity, temperature, free chlorine, or monochloramine, oxygen, turbidity, and in fresh water. The system combines user-specified instruments and sensors to create a customized system for monitoring water quality.

The system is designed for quick startup and low maintenance. No reagents – free chlorine and monochloramine sensors are completely reagent free. The system is prewired and plumbed with Variopol quick-disconnect sensors. It operates with low sample flow: <3gph (183 mL/min). There is a choice of digital outputs between HART® and Foundation fieldbus.

The WQS provides constant surveillance of water quality events that may affect the security of your distribution network. It helps ensure that acceptable water quality parameters are maintained throughout the distribution system and assists in meeting the requirements of the Surface Water Treatment Rule.



For Demanding Environments

Rosemount™ analytical two-wire transmitters are certified to be intrinsically safe when used with an appropriate safety barrier. The Rosemount 5081 and 1066 two-wire transmitters meet European CE requirements. The 5081 also meets the ATEX directive and is offered as FISCO configured. Both transmitters are weatherproof and corrosion-resistant. In addition, the transmitters meet Type 4X (IP65) criteria. Models are available to fit virtually any process monitoring and control scheme.



Rosemount 5081 Transmitter

The Rosemount 5081-C and 5081-T two-wire microprocessor transmitters measure conductivity using contacting and toroidal (inductive) sensors respectively. The 5081-C can also be configured to measure resistivity. The transmitters have a large two-line display that shows conductivity and temperature readings, and a high loop accuracy (within ±2% of actual conductivity and resistivity measurements).

The Rosemount 5081-A transmitter measures dissolved oxygen (ppm and ppb level), free chlorine or ozone in a variety of process liquids. The transmitter is compatible with model 499A sensors for oxygen, chlorine, and ozone, and with Hx438, Bx438 and Gx448 steam sterilizable oxygen sensors.

Rosemount 1066 Transmitter

This loop-powered analytical unit, serves industrial, commercial and municipal applications with the widest range of liquid measurement inputs available for a two-wire liquid transmitter.

The Rosemount 1066 SMART transmitter supports continuous measurement of one liquid



Rosemount 1066 Transmitter

analytical input. The design supports easy internal access and wiring connections. The large display gives excellent visibility for live measurements and displayed parameters. Conveniently, live process values are always displayed during programming and calibration routines.

The high-contrast LCD provides live measurement readouts in large digits and shows up to four additional variables or diagnostic parameters. The display parameters can be customized to meet user requirements.

The 1066 digital communications – HART® version 7 and FOUNDATION™ fieldbus communication protocols available for host monitoring and configuration can be switched between HART version 7 and HART version 5 at the transmitter. This makes it possible to take advantage of the new features of HART 7, or maintain compatibility with older HART 5 hosts. The fieldbus version of the 1066 transmitters provide the advanced features of ITK 6, along with additional function blocks to allow them to participate more fully in control in the field.



Rosemount 5081 Transmitter

The Rosemount 5081 fits easily into any plant communication scheme. Use a simple analog output or choose FOUNDATION™ fieldbus or HART digital communications. Digital communications in the 5081 bring all if the advantages of Emerson's Rosemount AMS windows to the user. Use AMS to setup and configure the transmitter, read process variables, and troubleshoot from a personal computer or host anywhere in the plant.

The 5081 features predictive sensor diagnostics that not only alert the user when a pH electrode is cracked or broken, but also signal conditions of impending failure, such as plugged or coated reference junction, aged glass, non-immersed electrode, and poisoned reference.

The Highest Standards

Emerson's complete line of Rosemount microprocessor-based analyzers are recognized worldwide for their high quality, reliability, ease of installation, and low maintenance. These analyzers are ideally suited for general purpose installations where line power (115/230 VAC or 24 VDC) is more convenient and integral alarm contacts are required to fit process control strategy. All analyzers provide scalable, isolated current outputs, easy-to-use display-driven menus, push button keypads, and advanced self-diagnostics. From the popular Rosemount 56 Series to our dual-input/output 1056, our analyzers provide continuous on-line measurement of pH, ORP, conductivity, resistivity, dissolved oxygen, ozone, free chlorine and monochloramine.

The Rosemount T1056 Clarity II™ dual sensor turbidimeter allows drinking water and wastewater plants to measure low-NTU turbidity for compliance with EPA and ISO regulations.



Rosemount 1056 Dual Input Transmitter

The Rosemount 1056 has a large display with easy-to-read process measurements that are always displayed during programming and calibration routines. The menu screens are intuitive with advanced diagnostics and help screens. Seven languages are included with every transmitter: English, French, German, Italian, Spanish, and Portuguese.

Standard features include isolated inputs, seven embedded local languages, two 4-20mA current outputs, removable connectors for power and current outputs, four solid plugs for closure of openings, and panel mount hardware.

Exclusive Quick Start screens appear the first time the 1056 is powered. The instrument auto-recognizes each measurement board and the display prompts the user to configure each sensor in a few quick steps for immediate deployment.

Rosemount 56 Dual Input Transmitter

The Rosemount 56 Dual Channel Transmitter supports continuous measurement of analytical inputs from one or two sensors. The modular design allows signal input boards to be field replaced,



Rosemount 56 Dual Channel Transmitter

making configuration changes easy.

The high resolution full-color display gives unsurpassed visibility and functionality for analytical instrumentation. The full-color display allows at-a-glance viewing of process readings – indoors or outdoors. Menus are intuitive for easy configuration and calibration. All menu screens are available in multiple local languages.

Simplified Quick Start screens appear the first time the unit is powered. The instrument auto recognizes each type of measurement board and prompts the user to configure each sensor loop in a few quick steps for immediate live readings.

The analyzer continuously monitors itself and the sensor(s) for fault and warning conditions. A complete user guide and trouble-shooting manual is embedded in the instrument's memory and easily accessed via the INFO key on the keypad. Detailed instructions and troubleshooting tips are intended to provide adequate guidance to resolve most problems on site.

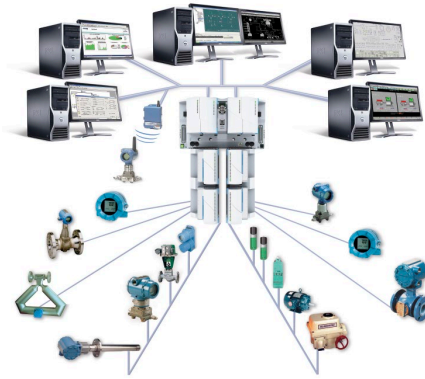


Rosemount 1056 Dual Measurement Transmitters

The modular design of the instrument allows signal input boards to be field replaced making configuration changes easy. It is easy to install with modular boards and removable connectors, along with easy to wire power, sensors, and outputs.

OVATION™ Distributed Control System

A system for power plants and generators, and water/wastewater plants



Emerson's five decades of power and water/wastewater industry expertise is embedded within the Ovation distributed control system to help power generators and municipalities of all sizes achieve significant operational, environmental, and economic benefits. By providing access to comprehensive, real-time data and predictive intelligence from throughout the enterprise, operators can better manage distributed systems and remote sites, streamline environmental reporting, and detect potential process and equipment problems before they occur.

Ovation™ advanced control and optimization strategies can help you achieve even more by targeting specific objectives such as

1. Reduced energy costs
2. Increased operational flexibility
3. Faster plant-startups

Beyond control and optimization, the Ovation system integrates machinery health and vibration monitoring, cybersecurity, generator excitation, and high-fidelity simulation all on a single platform — eliminating the complexity and cost of having to support multiple disparate systems.



DeltaV™ Distributed Control System

A system for oil and gas, refinery, chemical, and other industrial applications

The DeltaV Distributed Control System (DCS) helps you improve your operations by harnessing today's predictive technologies in an easy, intuitive, and interoperable way to connect your people, processes, and production. DeltaV combines powerful, easy-to-use software with robust, flexible hardware to simplify complex operations and increase productivity.

Proven easy-to-use technologies, such as Electronic Marshalling using characterization modules (CHARMs), allow users to reduce project complexity by eliminating design and test tasks, accommodating late changes without adding extra cost or schedule impact, and increasing system flexibility by making the I/O connections and controllers independent.



Emerson maintains a worldwide customer service presence. Our network of highly qualified people is dedicated to meeting your support, maintenance, and repair needs.

Exceptional Analytical Service and Support

Emerson's service capabilities are provided by professionals who are factory-trained on Rosemount products and are strategically located throughout the United States and around the world.

The Emerson Customer Support Center is staffed with trained professionals to make certain that customers receive the right answers, right now. Timely technical support and order administration is available with just one toll-free call to 1.800.854.8257, 5 am to 5 pm PST (in the USA). Globally, we have established international sales offices (see back page) staffed with factory-trained professionals. Reliable worldwide support for any Emerson product is only a phone call away.

FIELD ASSISTANCE

For immediate assistance concerning our products or information pertaining to any of our maintenance programs, contact our Customer Support Center at 800-854-8257 or any of Emerson's Rosemount locations within our worldwide service network.

Maintenance Programs

Emerson Life Cycle Services contract maintenance programs provide both preventive and corrective measures to assure continued performance and operation of your equipment. Certified Emerson field technicians can conduct these measures exclusively or in conjunction with your on-site personnel. We can provide service on demand at hourly rates or through fixed-fee maintenance agreements.

online. Our website at Emerson.com/RosemountLiquidAnalysis can link you to the information you need.



Maintenance Programs

Application Development

Emerson provides expert consultation to help you successfully apply our solutions to your particular application. We will take you through installation, start up, testing and documentation to help you solve your analysis problems and keep your process in compliance with applicable regulations.



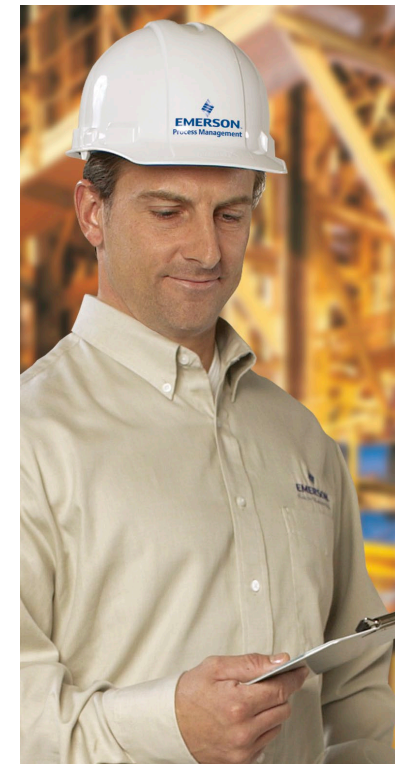
Technical Training Programs

Training

Training your in-house personnel is an integral part of our service. We offer a variety of high-quality technical training programs – both hands-on and on-line – that are designed to meet your specific needs.

Emerson.com/Rosemount LiquidAnalysis

Have a question? Our worldwide website offers a wealth of information about our products and services. From the latest product news and world area contact numbers, to checking order status and placing orders



Liquid Analytical Solutions for power plants, chemical plants, water and wastewater plants, and life science facilities



ROSEMOUNT™

Emerson offers a wide range of instruments and sensors for the continuous inline measurement of your process liquids.

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