



Transform your operations with real-time insight and run at your peak potential

Rosemount™ Measurement and Analytical Technologies
help you reliably maximize performance, profitability and safety.



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Emerson helps you achieve Top Quartile performance with faster, smarter decisions

Manufacturers face increasing demands for productivity on a scale never seen before, and may require you to reorient your business plans with an eye toward digital transformation and resource optimization that help drive business performance.

For both capital projects and ongoing operations, Emerson's Measurement and Analytical technologies provide insight and decision support to help you achieve Top Quartile performance - the top 25 percent of your peers. Real performance improvements in the areas that matter.

Innovative technologies to help you transform your operations and exceed performance expectations

Your facilities need safe, reliable process solutions that give insights to keep up with the ever-changing demands of complex operations. Continually striving for greater productivity and increased efficiency while attaining consistent measurements, precise analysis, and high safety standards is critical to your success.

Emerson has one of the industry's broadest portfolios to help you address the challenges of today for a more profitable tomorrow. Put Emerson's Measurement and Analytical technologies to work in your operations.

"Safety is more important than cost. We can now perform real-time monitoring of the floating roofs from the control room."
– Vice General Manager, Zhanjiang Port Group Co. Ltd.



"The technology of the Rosemount 3051S Electronic Remote Sensor (ERS)™ System is a game changer to replace other solutions that haven't been performing satisfactorily due to high maintenance costs and unreliability."
– Nick Ahlschlager, Area Supervisor Dakota Gasification



"This technology has opened up new possibilities. We plan to continue utilizing Rosemount Wireless technology to improve our oil production, improve our cost position, and make our people more productive."
– Michael Fischback, Facilities Engineer, PXP (Plains Exploration and Production Company)



"We're investing in the best performance for our process by installing Emerson's Cascade Aerosol Micro Leak Detection System to help us ensure product safety and quality, meet regulatory requirements, and avoid very high capital and maintenance costs."
– Mark Eggen, CEO TSI Supercool™ Specialty Lubricant Manufacturer



Emerson's tireless pursuit of innovation drives our portfolio of superior quality Measurement and Analytical technologies to provide insights needed to help you operate efficiently, safely, and with peace of mind.

Maximize your operation's potential to exceed performance expectations



Demands to push processes to do more, with greater process variability, makes optimizing your operation more difficult than ever. Emerson's Rosemount Measurement instrumentation products reduce operational complexity and deliver actionable insights that can allow you to meet and exceed production goals.



Improve Reliability and lower lifetime costs with repeatable, long-lasting process measurement under harsh conditions and operational challenges.

Minimize Emissions with the latest emission monitoring technologies and automating manual processes to gain enhanced insight to help protect your people, your facility, and the environment.

Optimize Production utilizing the power of connected services, smart devices, and predictive analysis to increase yield and market responsiveness with innovative process technology.



"We wanted to make sure our systems were fully operational in plenty of time, so we worked with specialists from Emerson. They advised us on upgrading our measurement systems and supplied and installed the new instrumentation, too."

- Graham Liddell, Engineering Manager, BPL

Expect Emerson quality across the globe

An extensive global presence helps you achieve operational synergies wherever needed. With products and services designed, engineered, produced, and distributed globally, you can expect high standards in everything we do.

Worldwide service capabilities anytime, anywhere

Protect your measurement instrumentation with services that support the lifecycle of your operation. Emerson's technicians, project management office, and educational courses help you operate at peak productivity.



Plantweb Digital Ecosystem

Advance your facility's performance in the areas of production, reliability, safety and energy management with the Plantweb™ Digital Ecosystem.



Pervasive Sensing > Secure First Mile > Analytics

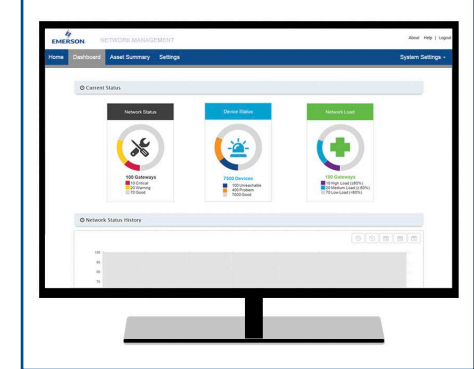
Increased measurement points utilizing wireless technology bring improved visibility across facilities and provide the basis for digitization efforts.



Helps ensure operational data and enables interaction with IT and cloud applications by implementing these architectures.



Scalable software applications provide increased visibility and deliver actionable insights, transforming work processes.



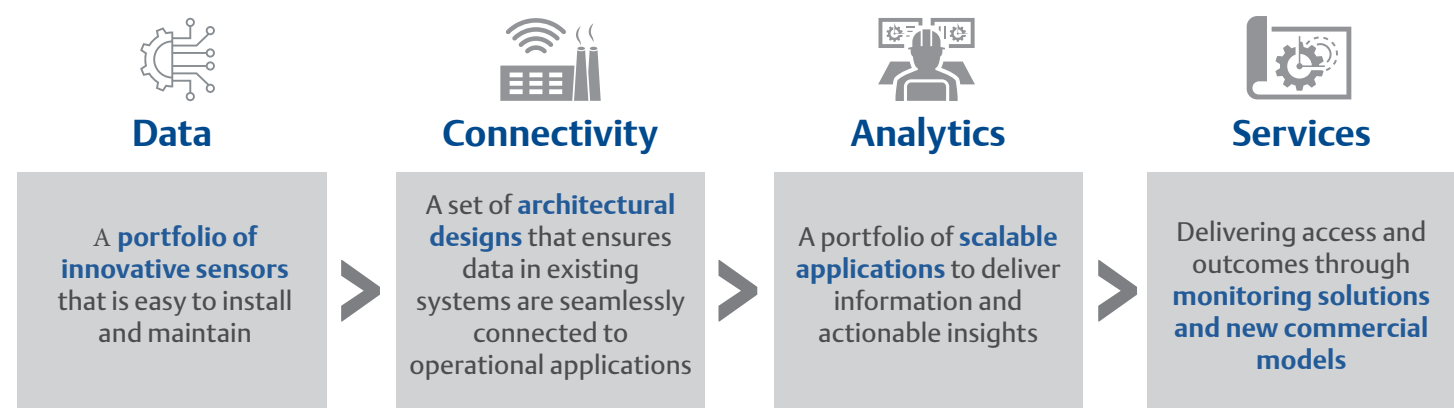
Services



Achieve operational outcomes by utilizing Emerson expertise in monitoring, consulting, education, and implementation services.

Digital Transformation

Emerson has identified building blocks to navigate digital transformation successfully. Using data to justify business investments, coupled with predictable scalable action plans for implementation and the right technology connectivity to bring the vision to life, digital transformation can be realized. Ensuring success involves preparing people and inspiring the workforce of the future. Emerson partners with our customers on their digital transformation journey, bringing our extensive expertise and full IIoT portfolio.



"Emerson is uniquely positioned to help our customers realize the promise of digital transformation through our Plantweb digital ecosystem. We understand that successful digital transformation begins with a clear focus and business case. We partner with customers to identify desired outcomes and help ensure their technology decisions and investments address specific business challenges."

- Stuart Harris, Group President, Digital Transformation, Emerson Automation Solutions

Wireless Technology

Traditional challenges, meet Wireless.



The foundation for your IIoT initiatives

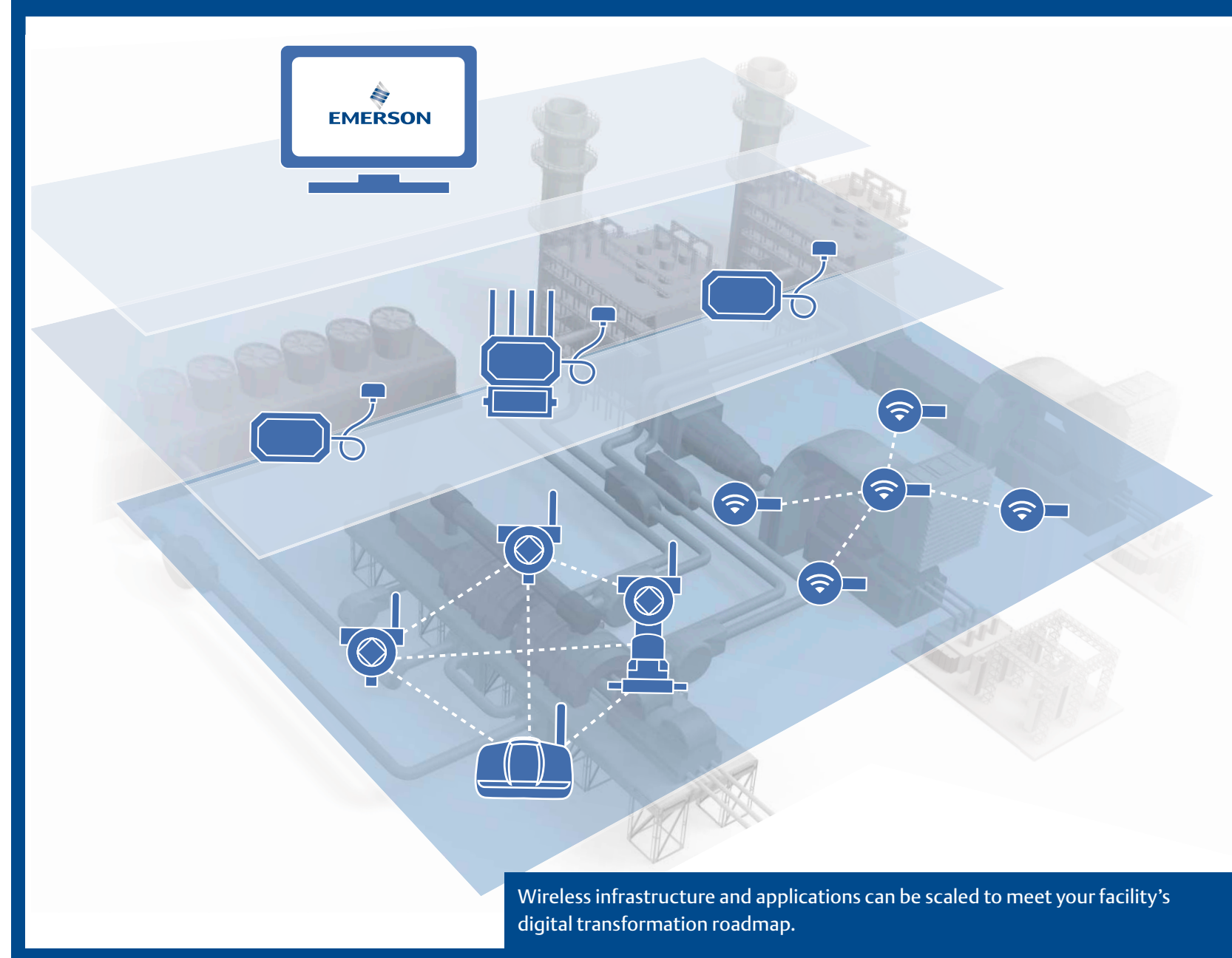
- Accelerate your digitization efforts and evolve your facility's processes
- Solve unique application challenges
- Achieve faster ROI

Cost-effective, easy-to-integrate

- Up to 60% less cost per device
 - Many non-intrusive device options
 - Less cabling and conduit
 - Self-powered
- Up to 65% less time per device*
 - Less engineering and faster commissioning times
 - Quick deployment, less training
 - Easy integration
 - Low maintenance

Enhanced levels of reliability and security

- Always-on, multitiered security
- 99% data reliability**
- Host system and instrumentation work together



Wireless infrastructure and applications can be scaled to meet your facility's digital transformation roadmap.

Digital transformation starts here

Today, businesses are evolving and automating processes at a steadily increasing pace. Evaluating digitization opportunities and finding projects with quick ROI can help improve operations and generate profits. Flexible, scalable, and robust wireless solutions are the foundation for digital transformation in process facilities.

From implementing a plant-wide wireless infrastructure to adding new monitoring points, Emerson can partner with your business to help advance your IIoT strategy and gain increased visibility and insights. With more than a decade of experience and a broad trusted wireless portfolio, Emerson has the technology to help transform your business for tomorrow.



"We were particularly impressed by the number and range of existing implementations around the world. Emerson's experience was far in front of the other vendors, and this experience gave us great confidence with our own application."

- Nicolas Delfose, AkzoNobel

* As compared to standard wired devices
 ** FieldComm Group WirelessHART® User Case Studies Brochure 2019

Plantweb Insight

Increased visibility to the data most critical to your operation.



Pre-built analytics give you actionable information

Plantweb Insight instantly interprets key asset health and infrastructure data using algorithms developed over decades of Emerson's industry experience. This scalable platform of software applications enables facilities to get actionable information faster and make better, more informed decisions.

Plantweb Insight applications can be easily accessed anytime you have a wireless connection to help improve operational efficiency, safety, and compliance.

- Gain better understanding of facility data with analytics
- Shift strategy from reactive to predictive
- Visualize your data via the intuitive web-based platform
- Easily integrate into your current systems
- Identify abnormal situations before they become critical

Location Awareness

Digitally transform facilities and extend IIoT to safety.

Advanced location solution

Evolving safety practices in industrial facilities have typically been too challenging and too costly to implement on a broader scale. Leveraging *WirelessHART*® technology, Emerson's Location Awareness provides a robust, yet cost-effective, digital monitoring system.

Safety mustering

- Monitor your muster points and receive alerts of personnel who have not arrived during an emergency or drill

Geofencing

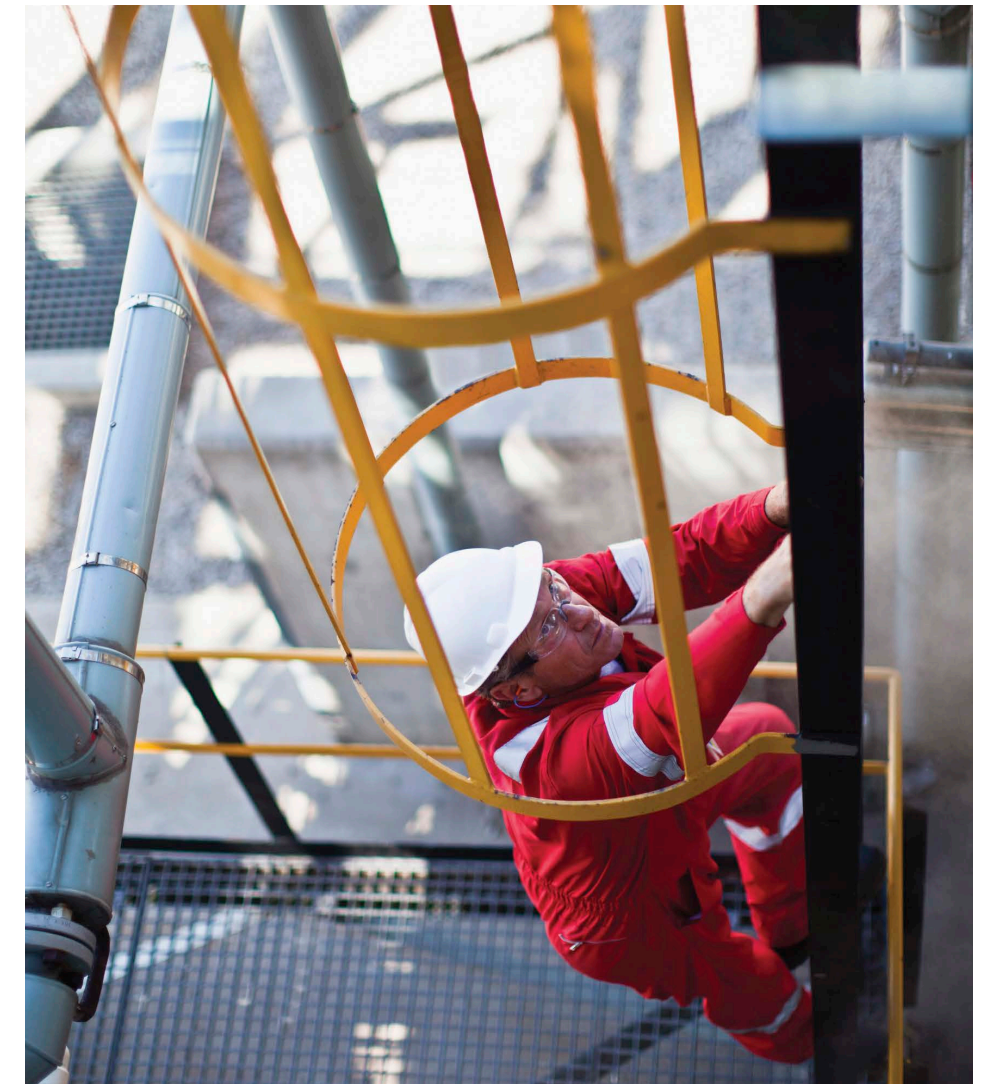
- Designate boundaries to restrict access based on training requirements

Safety alerts

- Personnel who are injured or find themselves in an unsafe situation can initiate an alert for potentially faster response

How it works

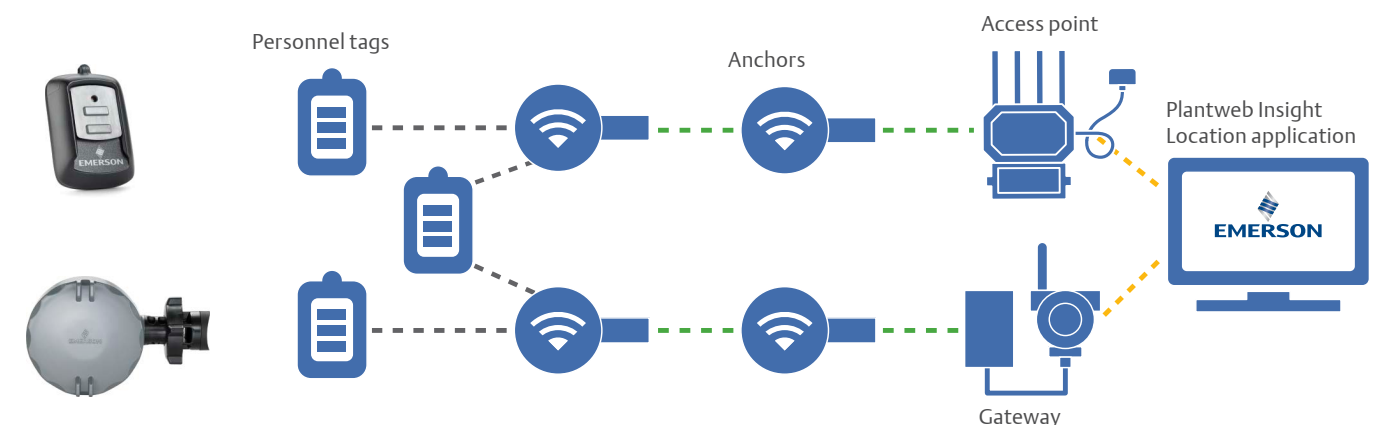
- Wearable tags actively send signals to fixed Location Anchors for relevant-time updates
- Location Anchors utilize *WirelessHART* to communicate to Wireless Gateways
- Data is provided in an intuitive user interface in the Plantweb Insight Location application



Focused on your key applications

Plantweb Insight applications leverage Pervasive Sensing strategies to fit a variety of applications in your facility, including:

- Pressure relief valves
- Heat exchangers
- Pumps
- Steam traps
- Corrosion
- Cooling towers
- And more



Wireless Corrosion and Erosion Monitoring Systems

Monitor pipework for maximum output.

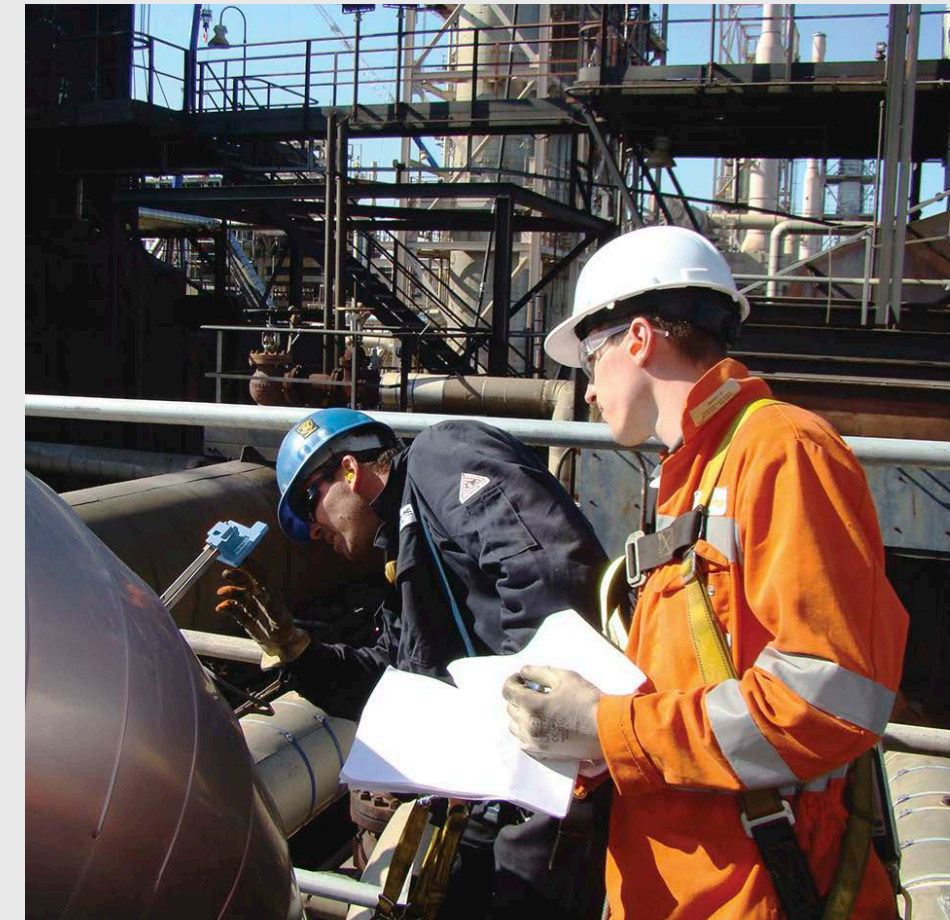


A comprehensive non-intrusive solution

Emerson's Rosemount Wireless Permasense™ technology provides a non-intrusive, sensor-based solution for ongoing monitoring of pipework metal loss from corrosion or erosion in extreme environments.

- Wireless delivery of wall thickness data is critical to managing equipment integrity while informing your decisions around timing and scope of planned maintenance, optimization of corrosion mitigation strategies, and feedstock selection
- Helps user's assets operate safely and reliably at maximum capability and profitability

Refinery Increases Profitability by Using Opportunity Crudes While Minimizing Corrosion Problems



The results

- Increased profitability by using data analytics
- Prevented shutdowns by verifying equipment conditions
- Improved insight to operating conditions with quantified corrosion aggressiveness of various crudes

“For a refinery processing 300,000 to 500,000 barrels each day, saving even \$1 or \$2 per barrel of feedstock cost can improve the profit picture considerably – but this approach can add costs through increased corrosion of piping and equipment if not monitored properly.”

Plant Engineer,
European Refinery

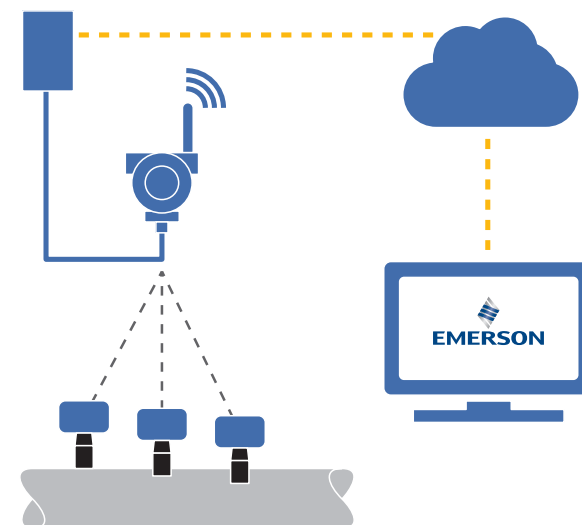
Innovative, proven technology for better-informed decision making

Wireless Permasense Technology

- Sophisticated data management software and analytics tools
- Non-intrusive ultrasonic sensor technology—continuously measures the impact of changing corrosion or erosion risk on asset integrity
- WirelessHART data retrieval

Corrosion Erosion Connected Services

- Skilled manpower available to assist with maintenance activities
- Detailed quarterly reports provide information about system performance and corrosion/erosion trends



A major European refiner was faced with low commodity prices and the need to improve profitability through buying opportunity crudes.

This exposed the plant to corrosive and erosive contaminants capable of destroying production piping and equipment from the inside out.

For a refinery processing up to 500,000 barrels each day, saving even \$1 or \$2 per barrel of feedstock can improve the profit picture considerably. However, opportunity crudes can also add costs and risks through increased manual inspections, running units too long, or requiring the plant to be cautious and shut down or replace items before they are needed.

To address these challenges the company needed to monitor wall thickness continuously in critical piping areas to minimize wear-and-tear on

piping and vessel wall thickness which could lead to failures and unnecessary shutdowns. They turned to Emerson and installed its Rosemount Wireless Permasense Corrosion and Erosion transmitters with data analysis software leveraging a WirelessHART network.

The analysis software provides a current thickness reading in the context of historical data and trends allowing operators to project the rate of metal loss and help determine the expected remaining life of any part of the process piping or equipment with a high degree of confidence. Once sufficient data and trend information had been collected, facility engineers were able to analyze the effects of specific operating conditions in addition to the characteristics of the crude oil to proactively improve operations and profitability.

Pressure Measurement

Gain the process insight to optimize every point.



The industry standard for reliability

For more than 50 years, Emerson's Rosemount pressure instruments have led the way in providing innovative solutions to critical measurement challenges in harsh environments.

The industry's broadest offering of pressure, flow, and level solutions includes:

- Differential, gage, and absolute pressure transmitters
- Differential Pressure (DP) flow meter solutions
- Level transmitters and Rosemount 3051S Electronic Remote Sensor (ERS) Systems
- Remote diaphragm seals
- Instrument manifolds
- Pressure gauges

With more than 20 million devices installed worldwide, Emerson pressure instruments deliver proven performance to help you enhance safety, reduce downtime and operate at higher levels of efficiency.

Innovation for quality, performance, and safety

- **Accelerate project execution and reduce costs** with leak-tested, installation-ready assemblies based on the compact design of the Rosemount Coplanar™ platform.
- **Drive better decision making and improve uptime** through early detection of abnormal situations with Process Intelligence and Plugged Impulse Line diagnostics.

- **Increase productivity and reduce maintenance** by controlling closer to setpoint with the Ultra for Flow performance class and extending calibration intervals with 15-year stability.
- **Help protect the safety of your people, facility, and the environment** by detecting wiring failures with the Loop Integrity diagnostic and by eliminating operator rounds with the Rosemount Wireless Pressure Gauge.

Achieve industry-leading field reliability and safety with Pressure instrumentation

Pressure transmitters



Instrument manifolds



Pressure gauges



Increase accuracy and reduce maintenance costs with DP Flow solutions

Flow meters



Primary elements



Simplify installation and improve performance with DP Level technologies

Level transmitters and seal systems



Electronic Remote Sensor (ERS) Systems



Thermal Range Expander



Pressure Transmitters, Manifolds, and Gauges

Accurate and dependable measurements - every time.



Field-proven performance to maximize uptime

- Increase confidence in your measurement with the industry's most reliable differential, gage and absolute pressure transmitters
- Meet your most demanding applications, from -76 °F (-60 °C) ambient to 770 °F (410 °C) process temperatures

Meet quality targets and production goals with the latest technology

- Deploy the world's only scalable transmitter platform – Emerson's Rosemount 3051S Series – backed by 15-year stability and a 15-year limited warranty
- Eliminate unnecessary maintenance routines with advanced diagnostic capabilities that predict abnormal situations before they impact your process

Improve performance with better installation practices

Coplanar process connections



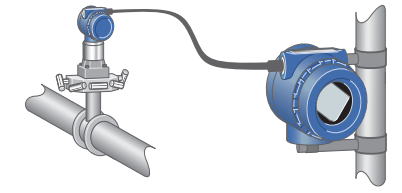
- Patented Coplanar transmitter reduces weight by 30% with a compact design
- Direct-mount capability eliminates hardware and potential leak points while simplifying the installation

Enhanced manifolds



- Rosemount R305 and R306 manifolds feature a two-piece stem and exclusive Pressure-Lock™ Valve technology
- Offers simplified operation, increased safety, and enhanced reliability

Remote display and Interface



- Enables at-grade transmitter access and supports more reliable direct mounting
- Provides easy and safe access to process and device information

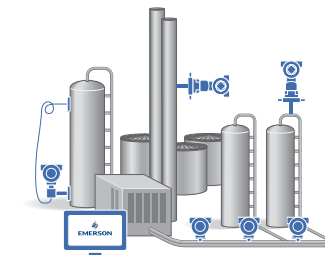
Reliability and safety in even the most demanding environments

SuperModule™ platform



- An all-welded, hermetic SST design resists process effects such as over-pressure and line pressure
- Robust platform delivers unmatched performance to maintain measurement repeatability

Advanced diagnostics



- Enhance SIL 2/3 safety and extend proof test intervals with certified diagnostic coverage from your process to the control room
- Proactively detect electrical loop issues and process abnormalities

High pressure capabilities



- High static differential pressure (DP) transmitters designed to 15,000 PSI static pressure
- GP/AP transmitters capable of measuring 20,000 PSI deliver superior performance and reliability in your most critical operations

Increase efficiency with insights and actionable data

Wireless pressure gauge

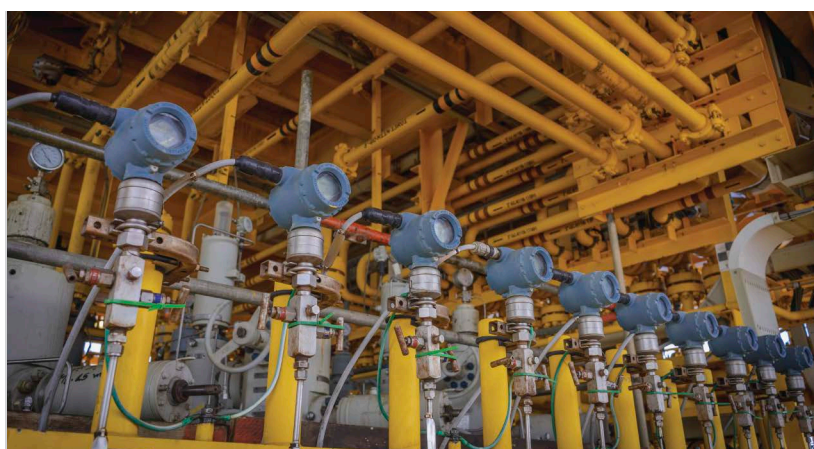


- Eliminate common mechanical gauge failures with Emerson's Rosemount pressure sensor technology
- Verify gauge readings from a central location and eliminate operator rounds with the Plantweb Insight Wireless Pressure Gauge application

Wireless pressure transmitters



- Wireless transmitters install in almost any location to monitor more points throughout your facility
- Fast and cost effective solution for flow, level and pressure measurement



"The Rosemount 3051S is the most important piece of equipment that we can turn to at any time – knowing that we can get the accuracy, reliability, and continued performance for any process measurement."

- Yoga Anand, Instrument and Controls Engineer, BP

Wireless Instrumentation Improves Cooling Tower Efficiency and Extends Turbine Life in Power Plant



The results

- Improved throughput of cooling towers with better thermal efficiency
- Increased turbine efficiency and reduced megawatt use by monitoring filters
- 50% reduction in preventative maintenance on turbines with online leak detection
- \$18K saved by extending lifetime of cooling tower fan

“Wireless provided a cost effective solution to bring new pressure, temperature, and DP readings online, enabling us to improve cooling tower performance and turbine efficiency.”

Plant Engineer,
Utility in California

A California public utility needed to monitor the performance and efficiency of cooling towers and turbines in their combined cycle plant to detect air pressure leaks faster, and to prevent air filter plugging and overheating.

The company could not monitor temperature inside their turbine compartments, which is needed to determine if there is a leak in forced air that cools the exhaust. As a result, they conducted frequent inspections to identify what caused their switches to close when overheated.

In addition, the utility’s current system for measuring air plugs did not give reliable readings, significantly decreasing turbine efficiency and causing the need to frequently clean the filters.

Safety was also a concern when pump valves shut and heated up pipes, which could potentially cause someone to get burned. It also risked damage to the pumps. The ability to monitor the

fire pump temperature would help the company improve safety and decrease pump damage.

The company partnered with Emerson for a comprehensive wireless instrumentation solution, giving them access to real-time data, reducing mechanic manual inspections to diagnose issues and realizing long-term cost savings. Emerson’s wireless temperature, pressure, and differential pressure transmitters were installed, enabling the company to improve process efficiency across the plant.

- Temperature transmitters provide online turbine compartment temperatures to detect leakage of hot air, and help protect against pump damage
- Pressure transmitters monitor air pressure on forced draft fans for turbine cooling, detecting leaks faster
- Differential Pressure transmitters monitor inlet air filter efficiency and detect clogs

Advanced Pressure Diagnostics Insight for truly informed process decisions.



Stay on top of the health of your process

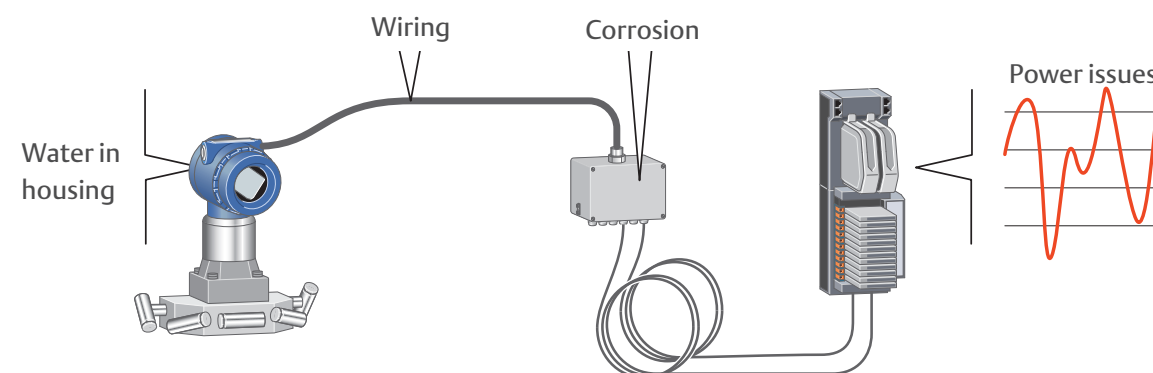
Help predict and prevent issues before they happen with the Rosemount 3051S transmitter with Advanced Diagnostics — the industry’s only field device to provide comprehensive diagnostics that go beyond the transmitter itself to cover both the process and the electrical loop.

- Spot problems before they impact production with the Process Intelligence diagnostic
- Detect degraded electrical loop issues that can potentially cause dangerous on-scale failures with Loop Integrity
- Proactively identify process connection issues with the Plugged Impulse Line diagnostic
- Extend proof test intervals using comprehensive diagnostic capabilities that can help improve safety compliance and ensure reliable operation of your Safety Instrumented Systems

Detect electrical loop issues with Loop Integrity Diagnostics

Everyday hazards such as environmental effects, human error, accidental damage, or an aging facility may lead to conditions such as corrosion, water in the housing, and unstable power supplies.

The Loop Integrity Diagnostic helps prevent on-scale failures before they potentially jeopardize your operations or safety by continuously monitoring for problems in the entire electrical loop and proactively detecting issues that can limit the power to your device.



Differential Pressure Flow

Accurate flow measurement for long-term performance.



Driven by innovation

- Emerson's diverse portfolio of primary elements, transmitters, and fully assembled flow meters provides a customized solution to address your measurement challenge
- Industry-leading differential pressure (DP) innovations including Emerson's Rosemount Annubar™ Primary Element, Conditioning Orifice, Integral Orifice, and MultiVariable™ technologies deliver unparalleled performance even in demanding and critical applications

Fully configured solutions for faster start-ups

- Save time and money with Emerson's Rosemount flow meters, which arrive fully configured, leak tested, and ready to install
- Reduce process penetrations and pipe straight run requirements as well as enable routine maintenance and installation without shutting down your process

Lower operating costs. Maximize energy savings.

With its innovative T-shape, Emerson's Rosemount Annubar primary element incurs one of the lowest permanent pressure losses of any flow device. This helps to reduce fuel consumption, decrease pumping and compressor costs, and increase plant capacity.



Solve common flow challenges with easy-to-maintain solutions

Minimize leak points



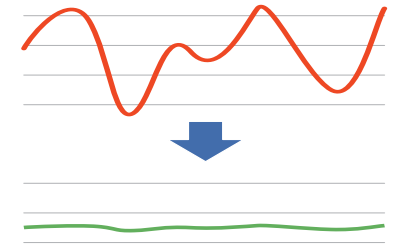
- Eliminate impulse lines and additional process penetrations with the Rosemount 405 Compact Flow Meter that mounts between existing flanges
- Reduce potential leak points by up to 70%

Simple, drop-in solution



- Reduce installation time with the all-welded Rosemount 9295 Process Flow Meter, which arrives preassembled and leak-checked
- Available with optional redundant transmitter assemblies, ideal for SIS applications

Large flow range accuracy



- Ultra for Flow is the industry's first percent of reading DP transmitter specification
- Improve accuracy and performance in high turndown applications by controlling closer to setpoint

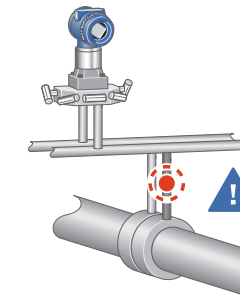
Increase visibility into process conditions and receive information when you need it most

Built-in flow calculations



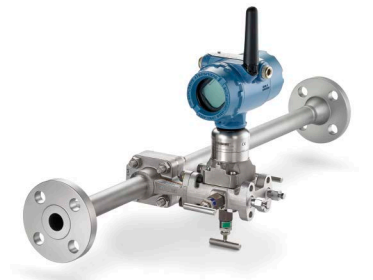
- Simplify mass and energy flow measurement with the Rosemount 3051S MultiVariable transmitter
- Eliminate guess work with two-step configuration and 3:1 measurement output

Advanced diagnostics



- Help eliminate unnecessary maintenance by proactively detecting and diagnosing process connection issues and plugged impulse lines before they impact production

Insight into remote locations



- Emerson offers the only native wireless DP flow meters with WirelessHART
- Add more monitoring points across your plant to help reduce maintenance costs and safety risks

Decrease energy costs, simplify installation, and increase flow measurement accuracy

Annubar technology



- The lower permanent pressure loss achieved by Annubar primary elements results in up to 50% energy savings
- Insertion technology reduces installation cost up to 90% over traditional orifice installations

Conditioning Orifice technology



- Reduces straight run requirements by 90%, enabling material, labor and procurement cost reductions
- Patented 4-hole design accurately measures flow regardless of upstream swirl and irregular flow profiles

Level Measurement

Solve your liquids and bulk solids challenges across all applications.



Full range of continuous and point level measurements

Emerson's portfolio for liquids and solids measurement covers a wide spectrum from basic point level detection to challenging continuous level, interface, and volume measurement, even in extreme conditions.

Increase uptime and make your process safer

- Fast remote proof-testing from the control room
- Automatic monitoring of tank roof position and advanced diagnostics alerting you to any abnormal conditions, which can increase uptime and make your process safer



"The Rosemount 5408 is very easy to work with. Installation was straightforward and the diagnostic wizards are excellent and very user friendly."

- Andreas Berndtsson, Instrument Technician, Södra Cell AB.

Meet all your continuous level measurement requirements

Guided wave radar



- Manage applications including solids, saturated steam, small spaces, and long ranges
- Measure and detect level and interface for process optimization
- Easy to install, Ideal for chamber applications and for replacing older technologies

Non-contacting radar



- Increased reliability and sensitivity in a wider range of applications
- Solutions to handle tank obstructions, agitators, corrosion, and contamination
- Advanced diagnostics help you reduce and plan maintenance ahead of time

Differential pressure



- Straightforward, easy to install liquid level technology that can be isolated by valves
- Handles demanding applications, extreme temperatures, and corrosive fluids
- Unaffected by surface conditions, foam, and internal obstructions

Overcome difficult application conditions and minimize costs

Ultrasonic



- Cost-effective solution for liquid level, volume, and open channel flow measurement
- Ideal for effluent pits and simple liquid storage

Vibrating fork



- Reliable high/low level alarms, overflow prevention and pump control
- Help prevent unplanned shutdowns with advanced diagnostics
- Fully integrated remote proof-testing

Magnetic level indicators



- Simple redundant measurement with no power required
- Low maintenance alternative to sight glasses with minimal leak points

Meet your productivity goals with efficiency, safety, and accuracy

Solids level measurement



- Emerson's Rosemount solids portfolio provides reliable, accurate level measurement for most solids applications, regardless of the solids surface, DC, density, filling rate, dust, or condensation

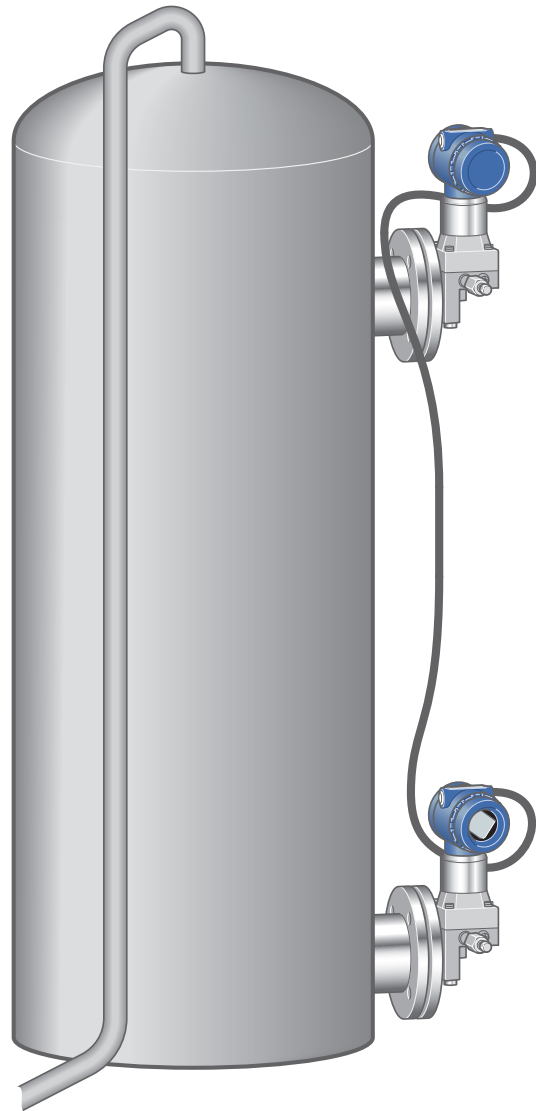
Inventory tank gauging



- Get highly accurate measurement data and real-time inventory calculations in bulk liquid storage tanks with Rosemount Tank Gauging Systems

Differential Pressure Level

Robust, proven technology for optimized plant operation.



Simplify installation with reliable solutions

- Achieve worry-free installations unaffected by vapor space changes, surface conditions or internal tank equipment
- Connect to virtually any process with Emerson's comprehensive offering of seals, full fluids, and materials

Improve performance using advanced technology

- For distillation towers and tall vessels, the Rosemount 3051S ERS System eliminates impulse piping and capillary using an innovative digital architecture
- The Rosemount 3051S Thermal Range Expander eliminates the need for heat tracing with a unique design rated up to 770 °F (410 °C) operating temperature range
- Ideal for applications with shorter spans and higher operating pressures, Tuned-System™ Assemblies improve response time and reduce installed costs by up to 20%

Leverage the industry's leading differential pressure (DP) level portfolio to run at your full potential

Broadest seal selection



- Protect transmitters from corrosive, erosive, or extreme temperature processes with Rosemount 1199 Remote Seals
- Wide variety of seals and 20 fill fluid options meet varying process requirements and industry-specific applications

Unparalleled performance



- Eliminate temperature error associated with capillary systems with the Rosemount 3051S ERS System technology
- Digital technology cuts response time by up to 90%

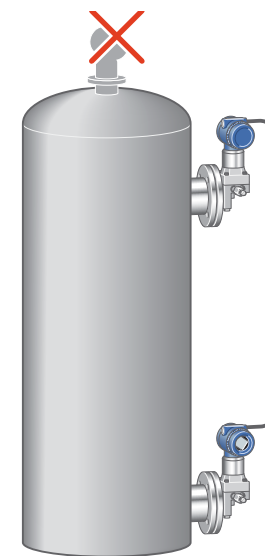
Reliability in demanding environments



- Ensure lasting, stable measurement performance in corrosive processes, hard vacuums, and other challenging applications
- Extend instrument life in high temperature applications with the Rosemount 3051S Thermal Range Expander

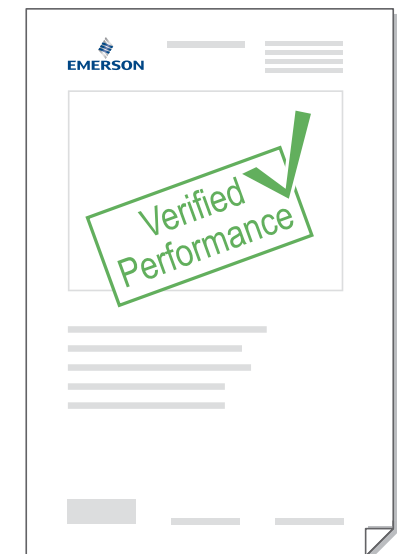
Gain enhanced process insight and confidence in your level measurements

Expand visibility into your tank beyond level



- Eliminate the need for separate blanket pressure transmitter
- Drive proactive maintenance practices through sensor diagnostics
- MultiVariable capabilities provide additional process information for optimized control

Verified performance



- Optimize performance and reduce risk by validating the seal configuration for your unique application
- Backed by a remote seal system performance certification



"[Using the Rosemount 3051S ERS System] we have reduced our maintenance time on this unit by nearly 40 percent, and have longer production cycles with fewer shutdowns and startups due to maintenance issues.

We have also been able to raise the upper limit of the level measurement, as we have improved the accuracy and reliability of the level measurement. This has made our unit more efficient and has reduced our overall cost to operate the column."

- Herr Andreas Busch-Ahlschläger, I&C Engineer, OXEA

Guided Wave and Non-Contacting Radar

Gain insights into your tank.



Reliable measurements across all applications

Whatever your application or process challenge, Emerson has the radar solution for your operation. Rosemount Radar Transmitters help you anticipate problems and take corrective action sooner, preventing downtime, spills, and safety incidents.

Better performance and uptime

- Find out what happened during a specific event with built-in historians
- Automate level and interface measurements in previously inaccessible locations with the world's first fully integrated wireless guided wave radar level transmitter
- Achieve increased reliability and sensitivity in a wider range of applications using Frequency Modulated Continuous Wave technology
- Get more reliable measurements with longer measurement ranges and better signal strength, using Direct Switch Technology
- Take out the troubleshooting guesswork with Signal Quality Metrics, which provide a "heads up" on the system before it becomes necessary to take a trip out to the field



Solids level measurement

Get accurate and cost effective solids measurement with minimum maintenance and easy installation using Emerson's Rosemount range of solids measurement devices. Designed to suit your application, they offer a complete range of continuous and point level sensors to help ensure you get the right solution for your particular challenge.

Unique features include a solids algorithm that emphasizes the reflection from rough and inclined surfaces to provide more reliable readings.

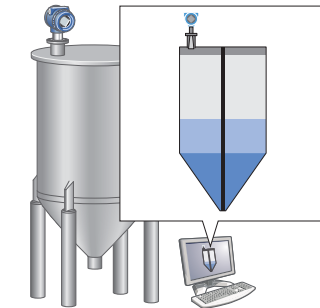
Engineered for ease-of-use

Safe, efficient proof-testing



- Carry out proof-testing efficiently with minimal process interruption, avoiding the need to climb tanks
- Advanced diagnostics alert you to any abnormal conditions, allowing for increased uptime and process safety

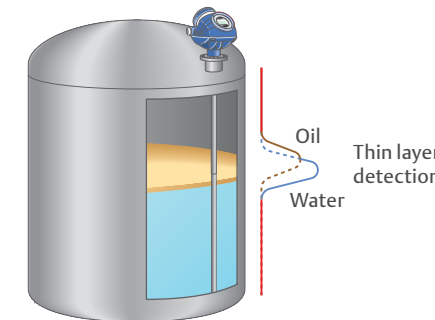
Easy to operate radar system



- Reduce installation costs and simplify the complexity of operations with Emerson's easy-to-use devices
- Decrease operator error with on-board pictorial user instructions, built-in historians, and easy configuration

Solve level challenges and improve uptime

Improved separation process and layer build-up notification



- Detect unwanted top layers to see if your process has been compromised, and optimize the separation process with thin layer technology
- Ensure reliable and accurate level readings and minimize shutdowns by utilizing preventative build up diagnostics

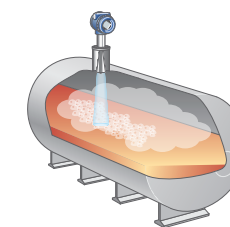
Accuracy and robustness in saturated steam



- Accurate measurements - without deviation - in challenging, saturated steam applications with Dynamic Vapor Compensation
- Help optimize boiler efficiency and decrease fuel costs by automatically compensating for variable process conditions

Increase visibility into process conditions

Technology designed for your application



- Robust and reliable measurement with maximized radar signal strength using FMCW technology
- Simplify installation by eliminating the need for O-rings with unique PTFE seal design
- Process seal antenna provides reliable measurement for applications with heavy condensation and aggressive media

Remote locations with wireless technology



- Automate processes that were not possible before with native WirelessHART guided wave radar and vibrating fork detectors
- Enable low cost installation and eliminate unnecessary field trips
- Configure, monitor, and control level from the control room and gain advanced diagnostics with proactive alerts



Gasum Uses a Certified System to Control LNG Terminal Operations

The Gasum Terminal in Lysekil, Sweden, is world leading in small-scale LNG handling. They sought for a solution to their big challenge – operate efficiently and safely using just one tank.

The facility supplies natural gas to an adjacent refinery, so it is critical to avoid unplanned shutdowns that would stop the flow of energy and cost millions of dollars.

An LNG tank is rarely, if ever, opened during its lifetime. Temperature control is crucial to avoid unwanted boil-off and evaporation leading to economical loss, safety and environmental hazards.

To meet these challenges, Gasum selected Emerson’s Rosemount Tank Gauging System based on radar technology. It requires minimum maintenance, and all electronics are accessible from outside the tank. Their tank is equipped with three Rosemount 5900S level gauges, each with an antenna suitable for cryogenic temperatures. This is a common configuration to help safeguard against false alarms, and to achieve redundancy.

They also installed Rosemount 2240S transmitters with sensors for multiple spot temperature measurements, cool-down and leak detection. An instrument for stratification detection was also added to prevent roll-over incidents. To further improve safety, Gasum utilized the comprehensive support within the Rosemount TankMaster Inventory Management System for convenient proof-testing from the control room.

“We don’t take any risks. A stop in operation is not an option, so we use the 2oo3 voting principle for safety and maintenance purposes.”

Benny Johansson
Terminal Manager, Gasum

Perstorp Solves Challenging Level Application

Perstorp, a specialty chemical plant in Sweden, needed to increase uptime in their reactors and mixer vessels to eliminate potential batch process losses while operating at maximum capacity.

Perstorp’s batch reactors have shaft agitators positioned at multiple levels, making the surface very turbulent with heavy condensation. Also, this agitation creates a thick layer of dense foam in some of the reactors. Previous level instruments were unreliable under those conditions.

For this challenging application, Perstorp installed the Rosemount 5408 non-contacting radar level transmitter with a condensation resistant process seal antenna.

The transmitter has high sensitivity and advanced signal processing, which can pick up the weaker signals in these extreme conditions, giving Perstorp the data needed to increase process efficiency.



The results

GASUM

- 99.5% availability
- Multimillion-dollar savings by avoiding unplanned shutdowns
- Improved safety with remote proof-testing and overfill prevention
- Increased plant efficiency with data insights

PERSTORP

- Reliable measurement despite challenging conditions
- Downtime reduced considerably
- Lower maintenance costs



“The Rosemount 5408 was able to handle turbulence, foam, and agitators and provide a reliable, stable level measurement.”

Perstorp Manager

Vibrating Fork Level Detectors

Help ensure your process is running safely and efficiently.



Ensure regulatory compliance

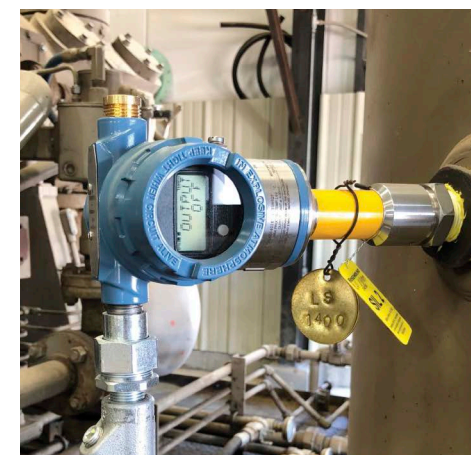
Environmental and safety regulations continually enforce monitoring of all tanks, while simultaneously, operators are constantly pushing to minimize costs. Emerson’s Rosemount Liquid Level Switches handle a wide range of applications, from overfill prevention duties to critical high and low level alarms. Unique fully integrated HART functionality makes it quick and simple to help ensure your process complies with major regulatory safety standards.

Eliminate overfills

- Bring your process to a safe state when needed with the most reliable point level detector in its class
- Verify functionality and reduce human error with simple proof-testing, minimizing process interruptions
- Reliability in harsh environments with robust designs and dual compartment housing

Prevent unplanned shutdowns

- Continuously monitor instrument health and be alerted to potential issues with powerful built-in diagnostics
- Proactively plan maintenance with fork corrosion and coating detection capabilities
- Detect unwanted sediment build-up in your vessel with unique sand switch functionality



Simplify your operations

- Reduce routine trips to the field with remote configuration, functional testing and troubleshooting capabilities
- Realize potentially significant savings in critical applications with unique fully integrated remote proof-testing that takes only minutes to perform
- Help keep personnel safe by avoiding the need to climb tanks, work in high places, or risk exposure to hazardous process media
- Wired and wireless technology provides flexibility for all types of installation

Tank Gauging

Achieve high performance bulk liquid measurement.



Use system features for comprehensive inventory management

- Measure level, temperature, and pressure for accurate volume and mass calculations
- Utilize complete inventory, hybrid, and custody transfer functions

Address safety concerns with unique features

- Use certified system solution for both automatic tank gauging, process control, and overfill prevention
- Get dual-level data utilizing a single nozzle with 2-in-1 technology
- Increase employee safety by performing remote proof-testing from the control room
- Monitor floating roof position

Achieve efficient upgrades with emulation technology

- Make cost efficient step-by-step upgrades of existing equipment from any major supplier on the market
- Replace old or malfunctioning field and control room equipment seamlessly
- Use existing cabling and communication protocols for quick and easy installation
- Reduce maintenance costs for more efficient operations

Use inventory and custody transfer tank gauging for your large volume tank storage applications

Secure efficient operations, reduce risk and measurement uncertainty with the Rosemount Tank Gauging System. It includes complete inventory management and devices for accurate measurements of tank storage data, such as level, temperature, and

pressure for net volume and density calculations. Use Emerson's targeted system solutions for bulk liquid storage in tank terminals, including LNG/cryogenic applications, refineries, and fuel depots.

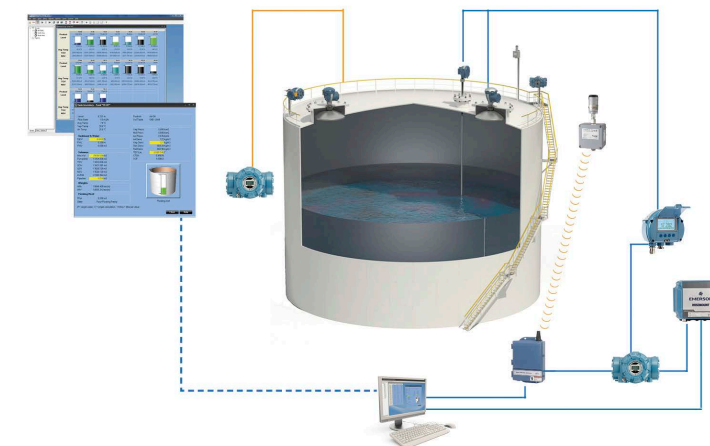
Control your inventory and custody transfer activities

Custody transfer certified radar level measurements



- Minimize maintenance with reliable and accurate radar level technology
- Save on costs with 2-in-1 gauge option to achieve redundancy, or SIL 3 certified safety in just one level device
- Reduce complexity with one gauge and customized antennas to fit various tank types and liquids, ranging from liquefied gas and gasoline to crude oil and asphalt

Complete inventory management functionality



- View current tank data to get insight into tank activities, allowing for better and more informed decision-making
- Control inventory with net volume and other calculations based on API and ISO standards
- Receive extensive support for inventory and custody transfer functions, e.g. batch handling, proof-testing and floating roof monitoring
- Perform easy system configuration and service

Reliable and flexible solutions even for the most demanding applications

Open and scalable system solutions



- Get dual data paths by leveraging both wired and wireless communication for maximum reliability
- Minimize cost by updating equipment as needed with support for all major communication protocols
- Perform a quick and safe installation utilizing 2-wire intrinsically safe cabling for power supply and measurement data

Temperature for bulk liquid storage



- Choose between single or multiple spot sensor options allowing for one or more measurements across the tank
- Use temperature transmitter with highly accurate and calibrated multiple spot sensors for critical measurements and very accurate net volume calculations
- Combine with free water level sensor for measurements close to the tank bottom

Cryogenic and refrigerated tanks



- Improve reliability with low maintenance radar level instrumentation supporting 2oo3 voting
- Use cryogenic sensors for multiple spot temperature measurement, cool-down, and leak detection
- Prevent roll-over incidents by detecting tank stratification layers in the tank

Temperature Measurement

Maintain your ideal process temperature to keep your operations flowing smoothly.



Make better decisions

Temperature is the most measured variable in process industries and is often the most critical factor. Emerson's Rosemount Temperature portfolio enables you to improve operational performance by increasing efficiency, decreasing energy consumption, and improving product quality. Innovative solutions stand up to extreme conditions and maximize control and throughput.

- Maintain your ideal temperature levels and keep your materials and operations flowing smoothly with reliable and accurate measurements
- Minimize downtime by leveraging Advanced Diagnostics for early detection of abnormal device or process conditions
- Gain process insights allowing you to improve uptime with innovative technologies and intelligent capabilities

Gain trust with every communication

Temperature transmitters



- Reliable temperature measurement with Advanced Diagnostics to detect sensor drift or failure while providing redundancy to help you maximize process uptime
- Reduce infrastructure costs by using High Density Transmitter technologies to measure hundreds of temperature points with the Rosemount 848
- Increase accuracy by up to 75% with Callendar–Van Dusen sensor matching capability in the Rosemount 3144P and Rosemount 644

Make the right connections

Temperature sensors



- Fast response times in your most critical applications to help keep your facility safe
- Achieve high accuracy with transmitter-sensor matching capability
- Reduce energy costs by maintaining optimal temperatures with ranges from -196° to 2192 °F (-321° to 1200 °C)
- Select from a wide variety of RTD and thermocouple sensors for any application and process environment for efficient and safe operations

Benefit from the experts who wrote the book on thermowells

Temperature thermowells



- Precision manufactured in a wide variety of mounting styles, process connections, and materials to meet all your application requirements
- Provides mechanical stability against process variables during the full lifecycle of sensors
- Standardized thermowell tests and certificates for traceability and safety

Increase reliability with reduced Vortex Induced Vibration

Twisted Square™ thermowells



- Simplifies calculations by eliminating over 90% of dynamic stress - the number one source of thermowell fatigue failures
- Eases design effort by reducing iterative calculations saving time to install
- Allows for longer thermowells at higher velocities for more accurate temperature measurements

Turn 50 hours of design time into 15 minutes

Emerson's Rosemount Thermowell Design Software automatically iterates thermowell design specifications to meet PTC 2016 standards.

- Saves up to 90% of design time vs conventional methods, automatically recalculating tags that fail
- Provides explanation for why process designs fail
- Adheres to ASME PTC 19.3 (2016) standards
- Eliminates redundant calculations

Rosemount X-well™ Technology Optimizes Heat Exchanger Efficiency, Saving Downtime and Maintenance Costs



The results

- **Reduced down time** with performance information at your fingertips
- **\$100K in annual maintenance savings**
- **Improved operation efficiency** by balancing cooling loads

“This Rosemount X-well 648 transmitter was commissioned in under an hour and seamlessly connected to the existing wireless infrastructure without process shut down or production loss.”

A major chemical manufacturer was lacking data to monitor the incoming and outgoing temperature of cooling water and process streams in heat exchangers, leading to high maintenance costs and increased energy consumption.

Without temperature data, it wasn't possible to monitor heat exchanger conditions and balance flow rates to determine when the exchanger should be cleaned. Consequently they regularly operated with two heat exchangers off-line for cleaning and one in operation.

Emerson worked with the manufacturer and identified 65

temperature points that would identify flow rates based on the energy balance of the heat exchanger, thus decreasing maintenance costs to clean when it was not necessary. However, installing traditional wired intrusive thermowell temperature points was considered too costly and the risk of creating new leak points in the process was considered too high.

“X-well technology saves us an estimated \$100,000 in annual operational costs.”

As a result, the company commissioned Emerson's non-intrusive Rosemount 648 with X-well technology, which

drastically reduced the cost of installation, eliminated the risk of leak points and provided the data needed to determine the flow rate of cooling water. The new insights into their operation gave them the knowledge needed to adjust valve positions for accurate flow balancing of cooling water through heat exchangers ensuring they are not running at rates that would lead to erosion or Microbial Induced Corrosion (MIC). In addition, using Emerson's Smart Gateway and AMS software the customer was able to easily bring the new temperature data into their Procedural Language (PL) data historian leading to the ability to anticipate potential maintenance.

No cutting. No welding. No thermowells.

X-well Technology gives you accurate process temperature measurement without process penetration



This innovative solution measures process temperature using X-well's built-in algorithm and eliminates the need for thermowells, wake frequency calculations, or process shutdowns.

- Cut the cost of each temperature measurement point by up to 29%
- Reduce engineering and design time by up to 65%
- Reduce installation time by up to 70% over conventional temperature instrumentation
- Available with Rosemount 3144P or Rosemount 648 transmitters for easy integration into your wired or wireless system



Available in stainless steel for extra protection in marine and offshore applications or where high corrosion protection is desired.

Flame and Gas Detection

Reliably safeguard your most valuable assets.



Fulfill your safety requirements

- Emerson's comprehensive flame and gas detection technologies provide protection from continuously evolving hazards
- Achieve peace of mind with asset security in diverse environments

Experience superior performance

- Reliably and consistently detect certain hazardous material releases
- Obtain accurate measurements with minimal false alarm disruptions

Benefit from technical expertise

- Emerson's experts recommend best practices, including device placement strategies for maximum coverage protection
- Receive technical support from an experienced representative before, during, and after device installation

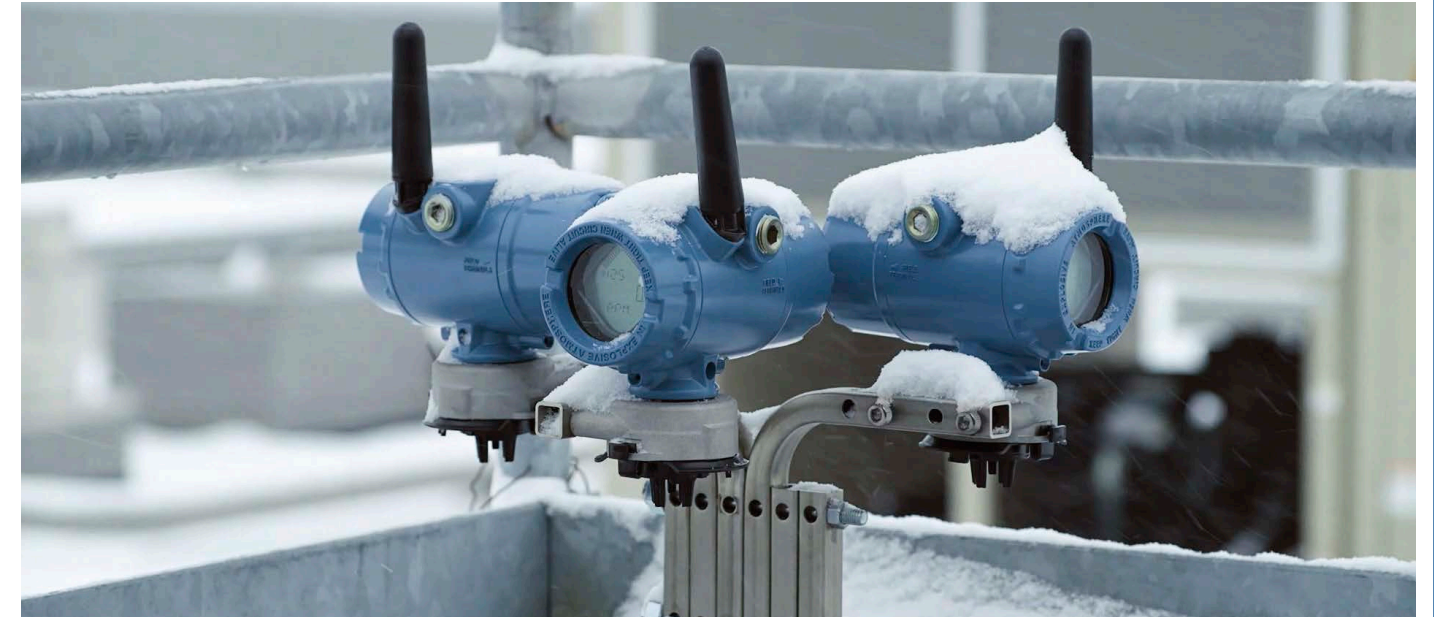


"The Incus is factory calibrated for life eliminating up to 64 hours of maintenance time per year per unit, an annual cost savings estimated at \$50,000 for 10 units."

- Manufacturing Engineering Manager at a major fertilizer manufacturer in Asia Pacific

Early detection in difficult to reach areas to prevent toxic gas exposure

Wireless gas monitors



- Obtain an early warning of gas presence to help prevent your employees from entering potentially hazardous areas
- Hot-swappable smart sensors are lab calibrated prior to installation, resulting in up to 50% periodic maintenance savings
- Save up to 60% on installation equipment costs by eliminating the need for expensive wiring

Real-time detection and diagnostics

Fixed point gas detectors



- Continuous, localized gas detection for a variety of toxic and combustible gases helps provide vital property and personnel protection
- Universal transmitters are compatible with universal electrochemical, infrared, and catalytic bead sensors for use in a wide range of applications
- Minimum power consumption enables cost saving benefits and improved longevity

Rapidly detect radiation emitted from a flame

Flame detectors



- Identify specific wavelengths associated with types of fires potentially occurring in a facility, resulting in up to 80% decrease in response time
- Effectively recognize and reject false alarms, reducing the need for plant personnel to make unnecessary, costly adjustments
- Wide field of view allows for an up to 31% increase in area coverage to maximize efficiency with fewer devices

Long range line-of-sight detection of gases

Open path gas detectors



- Provide efficient perimeter monitoring with reduced devices required for commissioning
- Straightforward one person installation, including simple alignment, for quick and easy setup
- Heated optics allow full performance in difficult weather conditions by preventing ice formation, snow build-up, and condensation on the lens

Listen for leaks with acoustic technology

Ultrasonic gas leak detectors



- Critical to aid in safe operation, these devices respond to gas leaks in high pressure processes, such as pipeline monitoring or gas compressor stations
- Achieve optimal asset protection with four independent sensors that provide a redundant, broad area detection coverage
- Maintains effective coverage in inclement weather, wind, leak or gas dilution, making it well-suited for use in ventilated outdoor applications

External measurements for harsh conditions

Gas and smoke aspirator systems



- The sensor and transmitter are located outside the sample area, preventing the effects of high heat or humidity
- Simplified plumbing for ease of installation and maintenance
- Placed in readily accessible locations, allowing for ease of maintenance and replacement

Liquid Analysis

Optimize operations with reliable liquid analytical measurement.



Your process liquid challenges, solved

Critical to many applications across your facilities, effective liquid analysis monitors, and controls: drinking water to ensure quality, wastewater to stay compliant, water purification to protect capital assets, sanitation systems to optimize processes, and much more.

- Dependable, accurate liquid analysis makes the difference for yielding profitable and productive processes, and Emerson experts will work with you to help make any necessary improvements and find a solution to any liquid analysis problem
- Emerson's global ability and proven technology offers a comprehensive range of analyzers, transmitters, and sensors for maintaining and controlling even the most demanding applications

Enhance process insight with continuous in-line measurement and monitoring

Dual channel transmitter



- Advanced transmitter with large, customizable screen provides at-a-glance view of two liquid measurements, diagnostics, and temperature readings
- Intuitive, easy-to-use design helps reduce configuration, installation, and maintenance time

Explosion-proof transmitter



- Intrinsically safe, explosion-proof design enables accurate measurement in hazardous areas
- Weatherproof and corrosion resistant enclosure allows for use in harsh environments

Reduce operating costs and minimize maintenance with high performance pH and ORP sensors

General purpose pH/ORP sensor



- Stable, reliable pH measurement you can count on across many applications

Scaling resistant pH/ORP sensor



- Built to extend sensor life in dirty, abrasive, coating, and high-solid applications

Poison resistant pH/ORP sensor



- Reduce reoccurring sensor costs with long lasting design built to protect against poisoning ions

High temperature pH/ORP sensors



- Lower cost of ownership with rebuildable design that allows continued use in high temperatures

Increase productivity and help maintain product quality with innovations for the Life Sciences industry

Single-Use pH sensor for biopharmaceutical processing

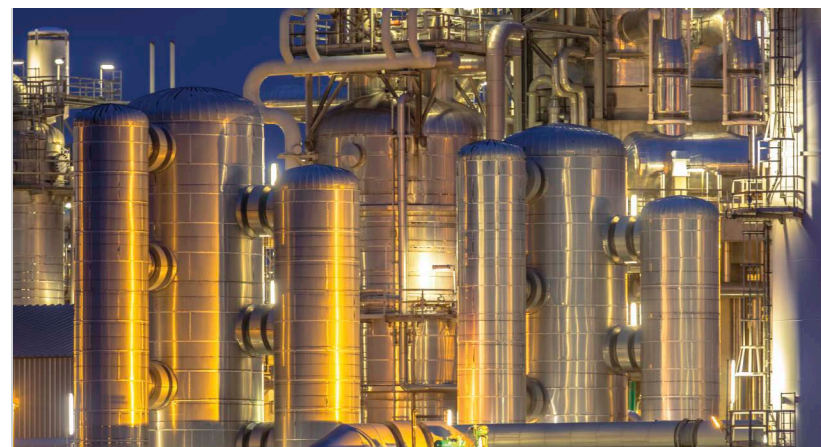


- Pre-installed and gamma irradiated on the bioreactor bag, eliminating installation and sterilization time
- Stored in wet environment for immediate verification and calibration, reducing set up time
- High stability eliminates maintenance or calibration after initial one-point standardization

Hygienic steam sterilizable pH sensor



- Pressurized reference gel prevents process fluid from entering the sensor, eliminating cross contamination and helping to maintain product quality
- Durable design maintains a drift-free pH signal after numerous sterilization cycles, providing long-lasting accurate and reliable measurement



"They are truly trying to understand our pains, to be engaged, to understand the impact that a given issue has on us. We are able to minimize maintenance and reduce costs because their sensor can last up to four times longer than others available."

**- Control Engineer,
Chemical Plant**



Accurate analysis means big gains for operators who must maintain safe, healthy water supplies. Emerson's sensors and systems provide reliable chlorine and ozone measurements that will help ensure the effectiveness of your water treatment and monitoring applications.

In addition to advanced technology solutions, Emerson's technical support and application expertise will help you meet regulatory compliance and keep your water safe.

Helps ensure water quality and regulatory compliance while controlling costs

Total chlorine sample conditioning system



- Complete sample conditioning system measures total chlorine in blow-down water and seawater treatment applications to help ensure effective water treatment

Free chlorine measuring system



- Achieve faster, easier installation with integrated pH sensor, chlorine sensor, connecting cable, analyzer, and flow controller
- Continuous pH correction eliminates use of reagents, reducing costs and maintenance

Amperometric ozone sensor



- Continuously measure dissolved ozone in water to optimize bottled water and semi-conductor applications
- Simple membrane and electrolyte replacement minimizes maintenance costs

Overcome application challenges and ease installation and maintenance

General purpose contacting conductivity sensor



- Ready-to-install sensors require no initial calibration and offer versatile mounting options for fast and easy installation
- Rugged corrosion-resistant electrodes maintain stable, accurate measurement

Hygienic conductivity sensor



- Optimize water-for-injection and clean-in-place with reliable conductivity measurement and monitoring
- Quick response time helps conserve costly solutions and enhance system performance

Toroidal conductivity sensor for heavy industrial environments



- Maintains consistent measurement and control in harsh, highly conductive liquid concentrations, prolonging sensor life and reducing maintenance
- Chemical-resistant options and high-vibration tolerance meet harsh application requirements

Reduce operating costs and increase uptime with sensors designed to last

Dissolved oxygen sensor



- Rugged construction provides reliable operation for applications ranging from power to wastewater
- Achieve longer sensor life with simple membrane and electrolyte replacement that minimizes maintenance and equipment costs

Steam sterilizable dissolved oxygen sensor



- Improve steam-in-place operations for life sciences, chemical, and food processing with fast and stable measurement
- Sensor functionality is maintained over many cleaning cycles, extending life and minimizing costs

Single-Use dissolved oxygen sensor adapter



- Enables placement of standard stainless steel dissolved oxygen sensor into Single-Use bioreactor bag without touching the process solution
- The sensor can be used for multiple batches, reducing disposable costs of single-use instrumentation



Liquid analytical measurements for sanitary applications

Liquid sensors and analyzers with rich online diagnostics provide insights that help streamline process performance by increasing throughput, minimizing waste, and improving quality for life science, food, and beverage manufacturers.

Conductivity, pH, and dissolved oxygen measurements are commonly used to maintain tight process control for sanitary applications, including steam-in-place and clean-in-place, by providing highly accurate measurements with fast response time.

Combustion Analysis

Meet regulatory requirements while improving combustion efficiency and uptime.



Optimize your combustion processes with confidence

Combustion analysis solutions from Emerson offer reliable and accurate measurement to help you maintain safe operation and efficient control.

Using the right technology solutions to optimize your combustion process, you can lower energy costs, minimize flue gas emissions, and meet regulatory requirements.

Emerson's Rosemount Combustion product portfolio has you covered for a wide-range of applications from a power plant, to a refining/ petrochemical plant, a cement kiln, or a chemical plant.

- Industrial and commercial boilers
- Process heater furnaces
- Incinerators
- Catalyst regeneration
- Cement and lime kilns
- Gas turbines
- Flue gas analysis



"When operating a boiler, the reliable measurement of oxygen is critical for safe and efficient operation. The Rosemount in situ oxygen probes have provided us with years of reliable service without failure."

**- Instrument Supervisor,
Power Cooperative**

Maintain optimal oxygen levels in flue gases

Robust in situ oxygen analyzer for multiple applications



- Provides accurate measurement of excess oxygen in flue gas, reducing energy costs, increasing safety, and lowering emissions
- Achieve a reduction in downtime and maintenance with the optional autocalibration capability embedded within the probe and durable zirconia oxygen-sensor cell

Oxygen and combustibles analyzer



- Patented zirconia oxygen sensor coupled with a combustible sensor provide accurate, reliable continuous measurement of combustion flue gases in reducing conditions and high temperatures
- Compact explosion-proof design is easy to mount and integral or remote electronics and autocalibration options simplify maintenance

Reduce installation time, maintenance costs, and environmental impacts

Commercial and light industrial in situ oxygen analyzers



- Offers the same reliable zirconia oxygen-sensing cell used in larger industrial technology, but is uniquely designed to meet the needs of small and mid-sized boiler applications
- Leak-proof design improves reliability and simplified maintenance can save time and money

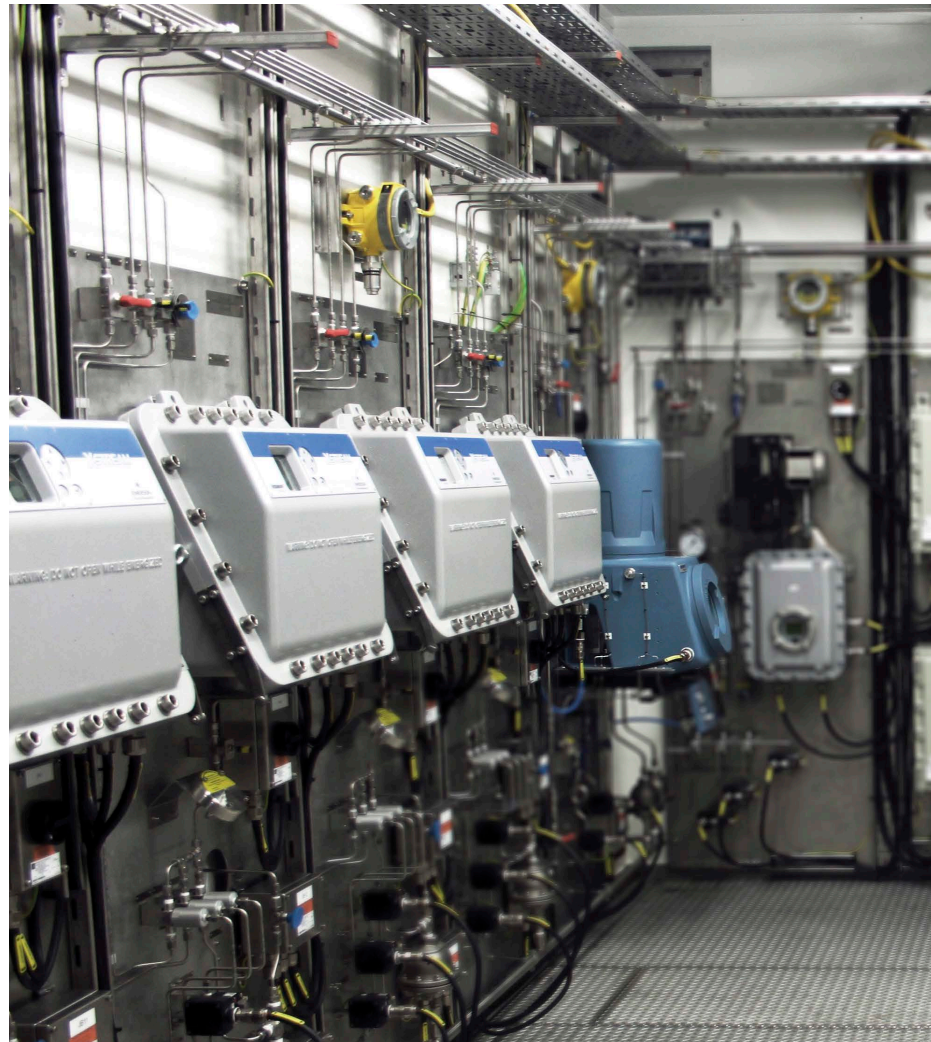
In situ oxygen analyzer for harsh environments



- Optimizes flue gas measurement with an explosion-proof rating, offering reliable measurement for maximum efficiency in hazardous areas
- Option to mount electronics to probe or remotely minimizes installation costs, and the field-repairable design enables ease of serviceability

Gas Analysis

Control and optimize your process while ensuring environmental compliance.



Reduce fiscal measurement uncertainty

- Expand your insight with critical compositional data to reduce lost and unaccounted-for gas
- Avoid two-phase flow measurement errors with reliable hydrocarbon dew point calculations

Improve process control

- Gain faster insight into your process with multi-component measurement
- Analysis of up to 12 different gases in a single device provides broader application flexibility

Ensure continuous emissions monitoring

- Simplify emissions monitoring with modular dry or wet systems that can be mounted closer to the sample probe for significant cost savings
- Avoid fines and meet regulations with reliable measurements of complex gases and emissions

Designed for the rigors of the real world

From C6+ natural gas measurement to complex process applications and emission monitoring solutions for regulatory compliance, Emerson's Rosemount Analyzers solve the toughest gas analysis challenges for a wide range of industries and applications. The hardened explosion-proof, field-mountable style of Emerson's Rosemount Gas

Analyzers enables increased efficiency and cost savings by minimizing or sometimes eliminating the need for additional flammable area protection or sample transport lines.

Meet specific gas composition analysis needs and save costs with scalable solutions

Field-mountable, transmitter-style gas chromatographs



- Ensure easier and cost effective installation and operation with explosion-proof, airless oven gas chromatographs
- Enable close-to-tap field mounting and reduce the need for costly enclosures or long sample lines

Rugged air-bath oven gas chromatographs



- Achieve faster analysis and cycle time in simultaneous, complex applications with concurrent analysis
- Enable installation flexibility with extended temperature performance

Ensure simultaneous measurement of up to 12 gas components in a single analyzer

High resolution Quantum Cascade Laser Analyzers for superior target gas selectivity



- Hybrid Quantum Cascade Laser (QCL)/ Tunable Diode Laser (TDL) spectroscopic technology expands gas analysis to both the near and mid-infrared range for enhanced process insight
- Accurate gas component detection and analysis without interference, filtration, reference cells, or chemometric manipulations
- Real-time validation assures analyzer performance and minimizes field maintenance intervention

Meet application needs with flexible multi-component and multi-method continuous gas analysis

Reliable process gas analyzers for selective detection of more than 60 gases



- Enable customized process gas analysis solutions with various cost-effective technologies and housing options to meet the needs of the most demanding of oil and gas, chemical, refining, environmental, medical, and automotive gas sensing applications
- Gain significant cost savings with the flexibility to combine non-dispersive infrared (NDIR)/ultraviolet (UV), paramagnetic, electrochemical oxygen, and thermal conductivity sensor technologies in one powerful instrument

A South Korea Refinery Gets Tighter Control of Ammonia Slip and Saves Over \$300K in Costs



A petroleum and refinery company in South Korea needed consistent measurement and control of ammonia to meet environmental regulations of nitrogen oxide (NOx) emissions and minimize waste during the combustion process.

Using the plant's legacy equipment, they relied on periodic validation of the analyzer and used lab reference values to inject ammonia, causing ammonia overdosing issues leading to economic and environmental problems.

In addition, maintaining the legacy analyzers required frequent calibration, costly consumables, and complex sample treatments to try to limit overdosing. Even with this effort, they experienced the formation of ammonia salts, plugging, and corroding in

downstream components and, during the process of removing NOx, experienced unreacted ammonia and ammonia slips.

The problem was solved by installing Emerson's Rosemount CT5100



The results

- Prevention of regulatory fines up to \$175K U.S.
- Increased plant efficiency and process control with reliable, direct ammonia measurement
- More than \$150K saved in operating costs annually due to reduction of ammonia overdosing

“The Rosemount CT5100 helped the plant achieve savings of more than \$150,000 U.S. in operating costs annually.”

Quantum Cascade Laser (QCL) Gas Analyzer, which delivered the needed precision (0–20 ppm) with an NH₃ limit of detection down to 0.1 ppmv (parts per million by volume) and repeatability of ±1 percent to ensure the efficiency of the selective catalytic reduction (SCR) performance. This helped the plant achieve savings of more than \$150K in operating costs annually due to reduction of ammonia overdosing.

Since the Rosemount CT5100 is a compact system capable of handling high sample gas temperatures (up to 374 °F/190 °C), the analyzer could be brought closer to the sample probe for speed and added reliability. Furthermore, it helped the plant prevent the formation of ammonia salts, which could plug or corrode downstream components.

Quantum Cascade Laser Technology

Make a quantum leap in process gas analysis and packaging leak detection.



Expand real-time insights

- Emerson's Rosemount Quantum Cascade Laser (QCL) technology offers fast, high resolution spectroscopy to detect and identify a range of gas molecules in the mid-infrared wavelength range
- Coupled with Tunable Diode Laser (TDL) spectroscopy and a patented laser chirp technique, a single instrument is now able to provide greater insight and monitoring in both the near and mid-infrared range of spectroscopic light for real-time gas measurement and analysis down to sub ppm concentrations

Improve process gas analysis sensitivity and selectivity

- Emerson's QCL process gas analyzers are the only solution able to analyze up to 12 components simultaneously in a single instrument at parts per billion sensitivity levels. This enables even trace levels of gas to be identified, which is required in applications such as NOx reduction (DeNOx), ethylene purity and natural gas custody transfer.
- Interference-free measurements help create greater and faster process insight, supporting both process efficiency improvements and emissions monitoring compliance

Detect package and container leaks with QCL technology

Leverage QCL technology to improve measurement performance and reliability in Aerosol, Food, Beverage and Pharmaceutical industries.

Food packaging: Help ensure product quality and improve productivity in Modified Atmosphere Packaging (MAP) by testing every package on the line and eliminating manual batch testing.

Aerosol packaging: Achieve applicable regulatory and quality compliance with instantaneous, contactless detection of prepropellants for leak-proof testing in aerosol manufacturing.

Pharmaceutical packaging: Realize instant ROI with automated leak detection and rejection that reduces costs and eliminates inefficiencies in existing test methods.



Analytical Systems

Reduce project cost, risk, and complexity with one source, engineered solutions.



Get the expertise you need—in one trusted partner

- Rely on Emerson to help design an analytical system that is able to meet your process gas and liquid analysis application needs over its entire lifetime
- Emerson's analytical experts help you not only design a more optimal analytical system, but also execute it and provide the end-to-end support needed to keep it profitable
- From an environmentally controlled shelter with HVAC, to complete multiple large scale analyzer shelters in different locations around the world, Emerson helps you simplify the complexities of even the most challenging applications to ensure on-time, on-budget delivery, and successful project completion when and where it is needed

Improve profitability with reliable and cost effective gas analysis systems

Integrated gas analysis systems



- Turnkey gas analysis solutions and integration capabilities backed by more than 70 years of analytical expertise across thousands of process installations
- Meet application needs with a variety of system packaging, including environmentally controlled shelters with HVAC, three-sided shelters, enclosures, and racks
- Gain access to a full portfolio of probes, fast loop and sample handling systems, auxiliary instrumentation, as well as a complete line of more than 100 analyzers and detectors

Ensure continuous measurement of your process liquids

Accurate liquid analysis systems



- Minimize corrosion and scaling, prevent equipment damage, and maximize plant availability with Steam & Water Analysis Systems (SWAS)
- Reagent-free Water Quality Systems (WQS) allows you to reduce the cost of consumables and maintenance
- Accurate measurement of pH, ORP, ozone, chlorine, dissolved oxygen, conductivity, silica, and turbidity with reliable liquid panels and racks

Get reliable process design and project management expertise all in one place

Optimized application design and execution



- Work closely with Emerson's Front End Engineering Design (FEED) and consulting services to assess your technical process requirements and implement a custom engineered, end-to-end solution that's right for your operation

Expert analytical project services



- Minimize risk, reduce complexity, and lower costs with a single point of responsibility for your entire project
- Benefit from a modular turnkey approach that can reduce schedules up to four months without requiring a slowdown or shutdown

A major LNG facility in Australia collaborated with Emerson analytical experts to design and implement a turnkey gas analysis solution, which enabled project schedule reduction by three months and ensured successful project completion ahead of the facility's first gas.



Lifecycle Services, Project Management, and Workforce Training

A global network of service capabilities.



Emerson's global network of Lifecycle Services offers maintenance, reliability, and performance services – anytime, anywhere. Project Management can support you from plant concept to start-up. Educational Services can train your workforce throughout plant life cycle and help prepare for the future.

Operate consistently, and economically

From start-up services to maintenance strategies, keep your plant running consistently and reliably to achieve your business goals with Emerson's Lifecycle Services.

- **Maintenance:** Get the technology and expertise you need to keep your process online
- **Reliability:** Consistently obtain accurate measurements, analysis, and diagnostics
- **Performance:** Optimize plant performance to achieve business goals

One less project risk

Expect projects to proceed as planned with Emerson managing your scope, schedule, budget, and aligning products to specifications.

We provide:

- Project-dedicated teams
- Leadership by PMP® certified project managers
- Strategically located, globally connected resources
- Standardized project management processes
- Documentation management services

Enhance skills through training

Empower your workforce by learning new technologies and refining critical skill sets to maximize performance.

Our courses are:

- Hands-on, in the Interactive Plant Environment
- Instructor-led, on-site at your facility or Emerson's, as well as virtually
- Online, at your own pace
- Customizable curriculum to meet specific needs

Emerson Automation Solutions

Explore the industry's broadest portfolio of technologies to measure, control, optimize, and power your operations, all backed by the expertise needed to help tackle your toughest challenges. For more information about all of Emerson's innovative brands and technologies, visit www.Emerson.com

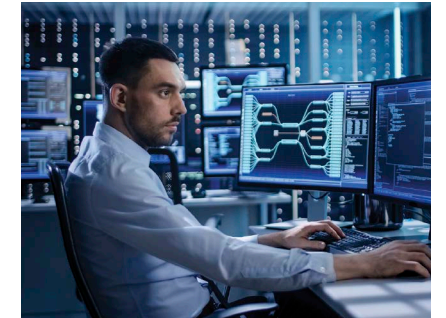
Measurement Instrumentation



Valves, Actuators, and Regulators



Control and Safety Systems



Asset Management



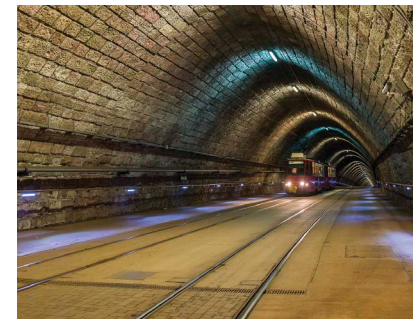
Fluid Control and Pneumatics



Operations and Business Management



Electrical Components and Lighting



Welding, Assembly, and Cleaning



Services, Consulting, and Training



Emerson's field-proven technologies execute in the toughest conditions, allowing you to maximize the performance, profitability, and safety of your applications.




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