



Take your business to
bold new heights with
the industry's most
extensive portfolio of
measurement devices

Measurement Instrumentation

Technologies to help you meet the
changing demands of the process industry
while reaching your safety, productivity
and sustainability goals



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Emerson helps you accelerate 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 Instrumentation 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 Instrumentation 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 Instrumentation technologies to provide insights needed to help you operate efficiently, safely, and with peace of mind.





Digital Transformation

Emerson has identified building blocks to navigate digital transformation successfully. Using data to justify business investments, coupled with predictable and 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.



Data

A portfolio of **innovative sensors** that are easy to install and maintain



Connectivity

A set of **architectural designs** that ensures data in existing systems are seamlessly connected to operational applications



Analytics

A portfolio of **scalable applications** to deliver information and actionable insights



Services

Delivering access and outcomes through **monitoring solutions and new commercial models**



Emerson's Advanced Diagnostic Solutions Help You Do More With Less

Emerson's advanced diagnostic solutions for measurement instrumentation help you do more with less by enhancing overall operations, augmenting the capabilities of front-line teams, and empowering them to direct their efforts towards the highest value-added tasks. Advanced diagnostics also provide value through improved confidence, prevention, and response.

Prevention

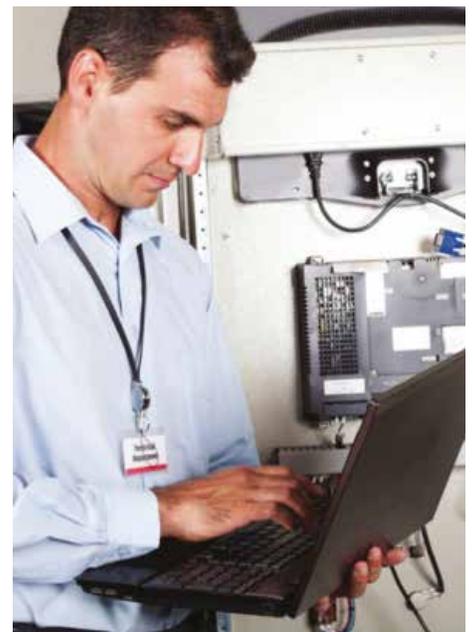
- With early alerts, you can prevent incidents and identify potential issues to enable planned maintenance
- Give less experienced technicians the insight to make expert-level decisions
- Identify an action needed automatically instead of performing manually

Confidence

- Redundant system for validating meter performance
- Supplement lost operational knowledge with advanced diagnostics
- Automatically execute compliance workflows
- Leverage Smart Meter Verification to verify flow meter performance in-line without interrupting flow or flow measurement

Response

- Simplify troubleshooting using actionable information
- Remote monitoring and inspection gets the right information to the right person at the right time
- Ease-of-use troubleshooting tools with access to historic data



MyEmerson – a collaborative environment to simplify and accelerate work online

MyEmerson accelerates digital transformation by connecting people and technology through streamlined work processes in a collaborative environment.

Quickly engineer solutions, manage software and installed assets, collaborate with experts, and streamline procurement processes to achieve measurement improvement in speed and productivity. An account with MyEmerson is more than a place to order products and parts, it is an interconnected, personalized digital experience.

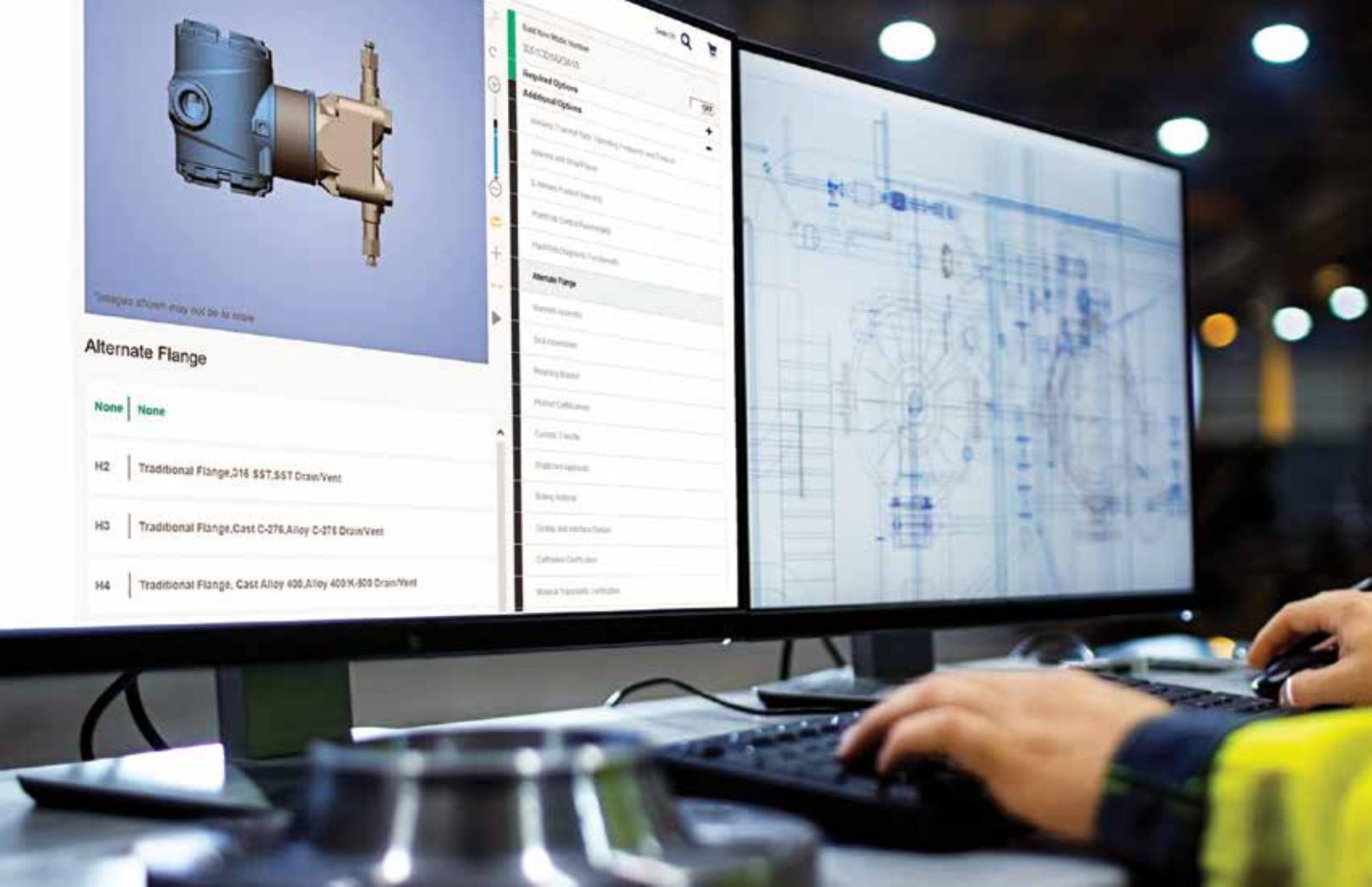
Digitally Connected and Aligned to Your Vision

- Access to flexible product training available online, virtually or in-person
- Collaborative workspaces and access to industry experts
- Real time access to technical documentation, serial number information and order status history
- Streamlined quoting and procurement processes history



Save Time Through Digital Tools

Our digital tools allow you to improve efficiency by choosing the right product for your application.



MyWorkspace

Increase efficiency with engineering tools to size and configure, generate drawings and collaborate.



MyTransactions

Streamline procurement process to more quickly create accurate quotes and orders, manage lead times and view transactional history.



MyAssets

Improve maintenance efficiency with digital record of installed devices, access to technical documents and recommended spare and replacement parts.





Bluetooth® Wireless Technology for Field Instrumentation

Bluetooth technology allows you to configure, maintain, or troubleshoot Emerson field instruments on-the-go to quickly perform rounds, resolve simple issues, and prioritize work to address what needs immediate attention. Use the AMS Device Configurator app to connect to any Bluetooth technology enabled Emerson field instrument.



Productivity

Quickly locate field devices and perform tasks related to configuration, device status, and diagnostics.



Reliability

Devices are protected from unnecessary exposure to the environment, increasing the reliability of the device and the process



Safety

Access device information from a safe location with reduced equipment and less time in hazardous areas.

Industrial Wireless Solutions

Advance your facility's performance in the areas of production, reliability, safety and energy management with Emerson's Industrial Wireless Solutions.



Wireless Solutions



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.



Pressure



Level



Corrosion



Services



Temperature



Gas



Acoustic



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

Discrete



Emerson Wireless Technology

Traditional challenges, meet Wireless



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.

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

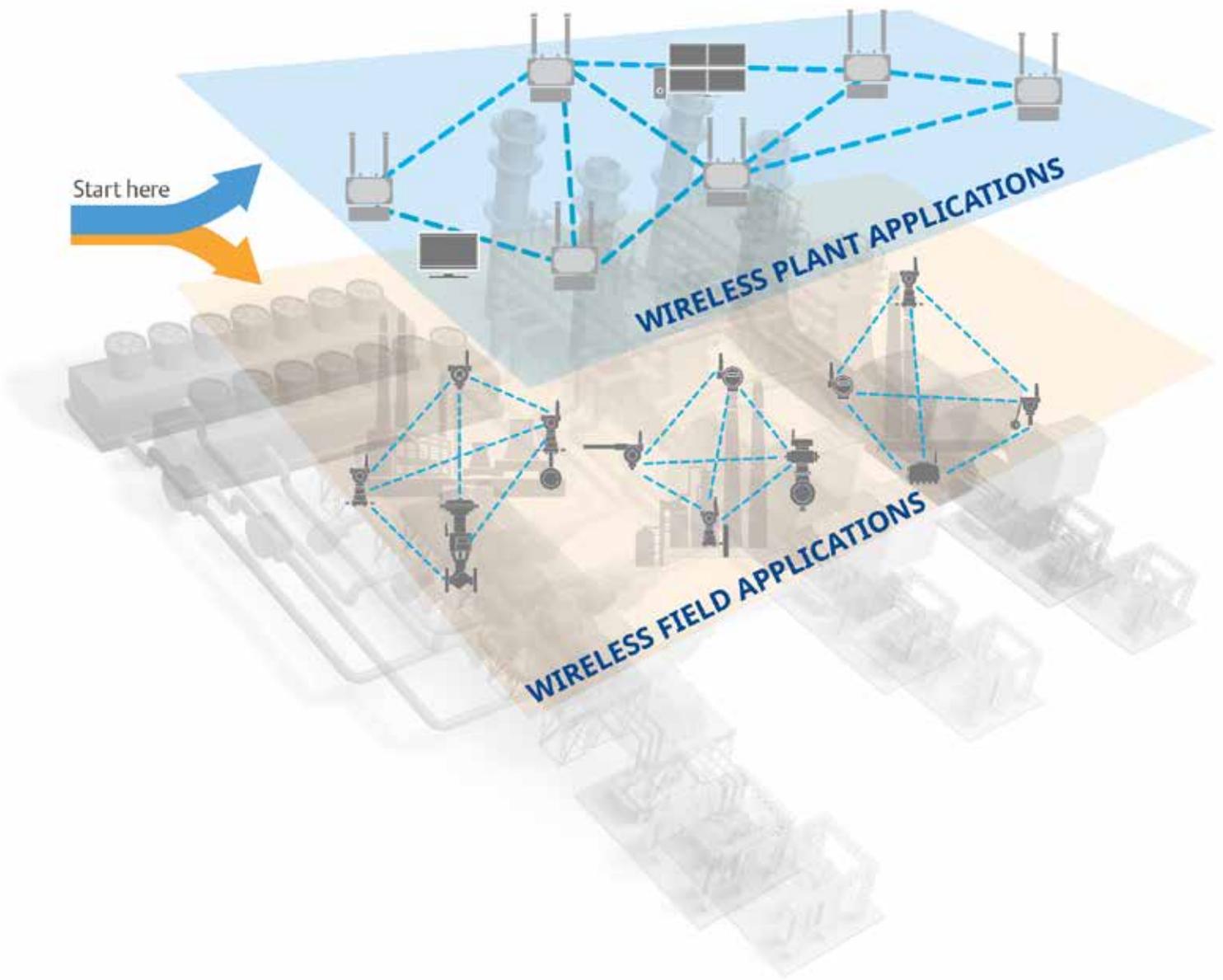
- Up to 60% less cost per device
 - Many non-intrusive device options
 - Less cabling and conduit
 - Self-powered
- Up to 65% less time per device*
 - Less engineering and faster commissioning times
 - Quick deployment, less training
 - Easy integration
 - Low maintenance

Enhanced Levels of Reliability and Security

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

* As compared to standard wired devices

** FieldComm Group *WirelessHART*® User Case Studies Brochure 2019



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



"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



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



Rosemount 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

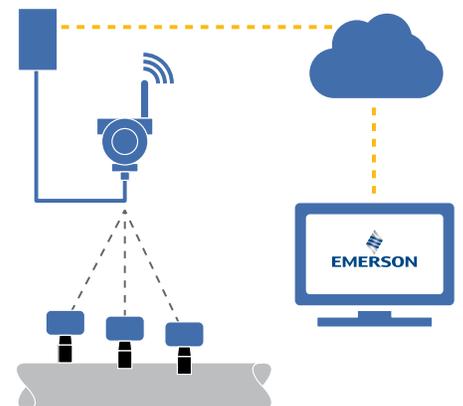
Innovative, Proven Technology for Better-informed Decision Making

Rosemount 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

Rosemount Corrosion Erosion Connected Services

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



Refinery Increases Profitability by Using Opportunity Crudes While Minimizing Corrosion Problems



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.



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**



Rosemount Pressure Measurement

Gain the process insight to optimize every point



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 set point 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, eliminating operator rounds with the Rosemount Wireless Pressure Gauges, and keeping personnel in safe environments with Bluetooth configuration.

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.

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



Rosemount 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



"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

Improve performance with better installation practices

Coplanar™ Process Connections



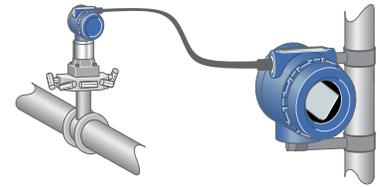
- Patented Coplanar transmitter platform provides flexibility to support a wide variety of pressure, level, and flow assemblies
- Direct-mount capability eliminates hardware and potential leak points while simplifying the installation

Enhanced Manifolds



- Rosemount R305 and R306 manifolds feature an exclusive Pressure-Lock™ Valve technology with easy-turn valves
- 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

Easy-to-use instrumentation with intuitive configuration

Graphical LCD Display



- Backlit graphical display for easy readability in all lighting conditions
- Ready to communicate in eight languages with visual icons that give better insight into transmitter status for a more intuitive experience

Application Configuration



- Transform your pressure measurement into a level or flow transmitter
- Guided setup of Level and Volume configuration simplifies even the most complex installations
- Measure flow rate with built in totalizer and low flow cutoff capability

Enhanced Logging Capability

Time Since	Action	Source	As Found	As Left
01 yr 003 days 02:14:53	Lower Range	HART Primary	1.25 inH2O	0.00 inH2O
01 yr 003 days 02:15:23	Upper Range	HART Secondary	101.33 inH2O	100.00 inH2O
01 yr 003 days 03:02:02	Loop Test	Display Buttons		
01 yr 003 days 05:27:13	Upper Trim	Bluetooth	20.41 mA	20.00 mA
01 yr 003 days 05:31:12	Lower Trim	HART Primary	4.32 mA	4.00 mA
01 yr 003 days 06:51:09	Restore Factory Trim	HART Primary		
01 yr 003 days 06:53:42	PV Change	HART Primary	Pressure	Level
01 yr 003 days 06:56:49	Log Cleared	HART Primary		

- All calibration and verification events stored conveniently in the device
- Diagnostic logs give insight to your process even when your not connected
- Guided partial and comprehensive proof test data accessible at any time

Increase efficiency with insights and actionable data

Bluetooth Capability



- Quickly locate field devices and check status or perform configuration and diagnostic tasks remotely with a mobile device or tablet
- Access devices from a safe location without the need for equipment or time spent in hazardous areas

Wireless Pressure Instrumentation



- Wireless pressure transmitters and gauges allow monitoring of more points throughout your facility
- Wireless data transmission eliminates the need for operator rounds

Micro Motion Coriolis Flow Meters

Best-in-class technology, best-in-class performance



Coriolis Overview

Emerson is dedicated to offering Micro Motion Coriolis products that deliver the three things that we believe are key to the success of your process: simplified solutions, measurement confidence and process insights.

Emerson offers a wide range of Coriolis flow meter products for any application — all of which are easy to install, configure and maintain. Not only do our products exhibit unparalleled real-world performance, but they also provide actionable insights that help you optimize your process and set you up for success.

To optimize your process and ensure that it is running smoothly, you need to have the right insights. Our technology and experts provide you with just that.

Emerson technologies offer powerful integrated diagnostics that provide you with process data and actionable information, enabling you to make quick, effective decisions. With our meters, issues such as two-phase flow or corrosion can easily be detected and addressed.

Material Balance and Product Quality in Polypropylene Manufacturing Improved with Micro Motion Flow Meters



The results

- Improved product consistency
- Monitored feed rate and solids content with a single device
- Enhanced process control
- Minimized unusable product

In the manufacturing of polypropylene, solid catalyst is mixed with solvent and injected into a polymerization reactor, where it is combined with propylene feed stock. The solvent is then extracted and recycled. The “dry” polymer is turned into pellets and injected with hot additives to produce the end product.

The primary reaction requires a precise mass balance between the catalyst and the propylene feedstock. If this balance is not maintained continuously as the components are combined, the polymer will be out of specification. Since the balance cannot be adjusted after the reaction occurs, an entire batch might have to be rejected. To achieve the correct continuous mass balance, it's critical that the feed rate of the catalyst slurry and its solids content are consistent and accurate. It is imperative to use a non-intrusive type of flow meter in the application.

Additives represent a very small quantity in proportion to the total process output, but injection rates must be properly controlled in order to maintain specification on the end product. The additives are typically maintained at temperatures between 100 °C and 150 °C and are viscous materials even at those temperatures, so they tend to coat the piping system.

Micro Motion Coriolis flow meters are ideally suited to this application for several reasons. Since they measure mass flow and density directly, critical process information on both the feed rate and solids content of the catalyst slurry can be monitored and controlled using a single device. The Coriolis sensor is non-intrusive and has no moving parts, so it is less affected by erosive properties of the solid catalyst. If erosion is a concern in the tubes, Smart Meter Verification can be scheduled to run routinely to

monitor the health of the tubes and to verify that the flow calibration has not changed. Furthermore, because the measurement is mass-based moderate coating of the sensor walls will not impair precise control of additive feed rates. Micro Motion meters can provide accurate mass flow rate data on the solvent makeup and regeneration, as well as the propylene feedstock. Resulting improvements in process control and evaluation capabilities represent a significant benefit.



Micro Motion Coriolis Sensor Portfolio

ELITE®

ELITE® Coriolis flow meters provide unmatched flow and density measurement performance for gas, liquid and multiphase applications.



F-Series



F-Series Coriolis meters deliver highly accurate mass, volume flow, and density measurement in applications that require a compact, drainable design.

G-Series



Ultracompact and lightweight, Micro Motion G-Series flow meters are ideally suited for process monitoring and optimization applications, offering easy selection with pre-configured models and simple installation with market leading compactness.

H-Series



Sanitary and Hygienic H-Series meters offer highly accurate mass flow, volume flow, and density measurement in a compact, drainable and cleanable design.

R-Series



Low-footprint, drainable R-Series Coriolis flow meters provide accurate flow and density measurements and are ideally suited for general purpose applications.

HPC-Series



The ideal solution for challenging high-pressure processes, the High-Pressure Coriolis flow meters work well in applications such as chemical injection on offshore platforms. Accurate, repeatable measurement ensures precision downhole chemical delivery.

TA-Series



TA-Series Coriolis Flow and Density meters have all wetted material constructed from pure tantalum and are ideal for handling corrosive fluids, such as acids and bases.

T-Series



T-Series meters feature all titanium wetted parts for corrosion resistance and offer superior flow measurement in a straight-tube, full-bore meter design.

Micro Motion Coriolis Transmitter Portfolio

5700



Delivering the best in measurement technology and unparalleled support, the 5700 transmitter's intuitive design ensures measurement confidence, valuable process insight and productivity through simplified solutions. Data historian feature captures rich information about process events, fluid quality, and measurement stability - over long and short periods of time. Zero Verification tool provides confidence in the meter zero and analyzes process conditions to indicate potential issues for re-zeroing. The 5700 offers a wireless configuration display option with a Wi-Fi display point to point connection using ProLink.

1600



With a compact and light design, the 1600 transmitter delivers ease of integration with a native Ethernet connection and Power over Ethernet. A suite of powerful software solutions provide measurement confidence and valuable process insight in the most challenging applications. The data historian feature captures rich information about process events, fluid quality, and measurement stability - over long and short periods of time.

1700/2700



The 1700/2700 transmitters feature a rugged Class I, Division 1 / Zone 1 housing with an optional local operator interface designed to make flow meter access easy. Flow meter commissioning is simple and straight-forward with virtually no special programming requirements.

4200



The 4200 2-wire Coriolis meter lowers capital expenditures and provides a faster commissioning time with the ability to share power and signal over the same pair of wires reducing installation, engineering, and planning costs. The 2-wire Coriolis meter does not require any straight runs or flow conditioning providing a robust, repeatable, and reliable solution with no moving parts, and wide turndown, improving product quality leading to less rework and waste.

4700



The Micro Motion 4700 Transmitter offers a compact C1D1 (Zone 1) housing, scalability from 1-3 output channels that are configurable and licensed options, 4-wire/9-wire backwards compatibility, and can be fully configurable using the local operator interface. The optional data historian allows the ability to access time stamped process and meter diagnostic data. The optional Bluetooth® display offers wireless configuration that helps to avoid the need for a hot work permit to connect to the device and increases productivity and safety by minimizing the time spent in potential hazardous areas. Smart Meter Verification Basic is onboard as a standard that offers confidence that the meter is working properly.

3500/3700



With combined Coriolis transmitter functions and PLC capabilities, the Micro Motion Series 3000 is built for industry-focused solutions, including net oil computer, enhanced density, custody transfer and marine fuel bunkering solutions.

1500/2500



1500/2500 DIN rail-mounted transmitters easily fit into control room panels. A simple four-wire connection to the sensors for power and signal eliminates the expense of custom cabling.



Micro Motion Density and Viscosity Solutions



Micro Motion Portfolio

The Micro Motion portfolio of density and viscosity products have been designed with measurement speed, accuracy and robustness in mind. As such they are highly flexible and are suitable for use in many different applications and industries including Oil & Gas, Refining, Chemical/ Petrochemical, Power, Food and Beverage, Mining and Minerals and several others.

Universal Features and Functionality

- Single, flexible, common transmitter across platform
- Interconnectivity - Direct input of external measurement variables for enhanced readings through HART I/O
- Application specific pre-configured outputs simplify startup and reduce commissioning costs
- KDV meter health diagnostics identifies corrosion, erosion or coating

Key Advantages

- **Speed of response** - Quick response to process changes for fast loop control
- **Accuracy** - Optimized yields and reduced costs
- **No moving parts** - Low/No maintenance means reduced operating costs
- **Robust design** - Minimum down-time and longer meter life
- **Installation flexibility** - Reduced installation time and costs
- **Integral temperature measurement** - Improved fluid characterization and optimization

Micro Motion Density and Viscosity Portfolio

Compact Density Meter (CDM)



The Compact Density Meter (CDM) is the next generation in fiscal custody transfer and precision process density and concentration measurement. Matching face to face dimension and remote electronics allow for direct replacement of the 7835 and 7845 density meters.

Fork Density Meter (FDM)



The Fork Density Meter (FDM) is the latest development in direct insertion density and concentration. Available in several wetted materials, surface finishes, and stem lengths to fit wide variety of applications.

Fork Viscosity Meter (FVM)



The Fork Viscosity Meter (FVM) is the latest development in multivariable direct insertion viscosity meters. These unique meters provide unbeatable installation flexibility, and robustness.

Gas Density Meter (GDM)



The Gas Density Meter (GDM) is the next generation in very accurate, fast response direct gas density measurement. It's designed for critical applications where reliability and accuracy are critical.

Gas Specific Gravity Meter (SGM)



The Gas Specific Gravity Meter (SGM) is the industry standard for direct measurement of specific gravity, molecular weight, relative density, Calorific Value/BTU and Wobbe Index.

Heavy Fuel Viscosity Meter (HFVM)



The HFVM Viscomaster is a high performance, multivariable viscosity meter designed for the measurement and control of heavy fuel oil (HFO) that supply engines, turbines and burners in Marine and Power applications.

Rosemount Ultrasonic Flow Meters

Bridging innovation and intelligence for custody transfer applications



Reduce Measurement Uncertainty

- Troubleshoot with performance-based diagnostics, expert analysis, disturbance alerts and suggested corrective actions

Maximize Uptime, Minimize Costs

- Advanced meter design has no moving parts and offers bi-directional flow capabilities, increased flow capacity and no incremental pressure drop
- High rangeability of >100:1 ensures fewer meter runs, smaller line sizes and lower capital costs

Highest Accuracy for Custody Transfer

- Eight-path gas meter offers best-in-class resolution of flow and swirl calculation for flow distortions

Ultrasonic Flow Meter Overview

Rosemount Ultrasonic Flow Meters are used around the world in a variety of critical measurement applications. Commonly installed in onshore and offshore production facilities, natural gas transmission pipelines, compressor stations, processing facilities and city gates, these products are useful for custody transfer, allocation, check metering, leak detection and storage.

Combining field-proven, smart meter design which rapidly detects abnormal flow profiles and contaminants, and offers a wealth of predictive diagnostics, Rosemount Ultrasonic Flow Meters enable you to be more profitable and confident in your measurement by using its advanced capabilities to maximize productivity, quality and safety.

Rosemount Gas Ultrasonic Flow Meters

SeniorSonic 3414 4-Path



Natural gas custody transfer applications requiring high accuracy and low maintenance.

- Four-path chordal design reduces susceptibility to meter fouling

3415 4+1 and 3416 4+2 Dual Configuration



Exceptional custody transfer accuracy and reliability

- Sensitive vertical reflective paths detect trace amounts of liquid and other debris build-up

Redundant 4+4 3417 4-Path



Maximize uptime with superior custody transfer accuracy.

- Fully redundant with two 4-path chordal, British Gas-design meters
- Wet, rich and/or dirty gas applications

3418 8-Path Gas Ultrasonic Flow Meter



Highest accuracy and reliability for custody transfer.

- 0.5 OIML accuracy class requires only five diameters of straight run with no flow conditioner
- Available line sizes: 254 mm to 1066 mm (10 in to 42 in)

JuniorSonic 3412 2-Path Gas Ultrasonic Flow Meter



Ideal for natural gas non-custody transfer applications

- Two-path design for measurement redundancy
- Wet gas tolerant
- Flow calibrated accuracy: $\pm 0.5\%$ of reading relative to lab
- Available line sizes: 100 mm to 914 mm (4 in to 36 in)

Rosemount Liquid Ultrasonic Flow Meters

3812 2-Path Liquid Ultrasonic Flow Meter



Reliable and economical solution for non-custody transfer applications.

- Two direct measurement chords measure the transit times of ultrasonic pulses passing through the liquid in two parallel paths
- Field-replaceable transducers simplify maintenance
- Bi-directional flow capabilities simplify installation

3814 4-Path Liquid Ultrasonic Flow Meter



Ideal for custody transfer applications requiring high accuracy, low maintenance, and low pressure drop.

- Well suited for custody transfer, leak detection, and inventory control applications
- 4-path chordal design allows for cross-flow compensation in each measuring plane



Flexim Non-Intrusive Ultrasonic Flow Meters



FLUXUS® measures the difference

Emerson's Flexim Non-Intrusive Ultrasonic flow measurement technologies measure virtually anything that flows, liquids as well as gases. Our proprietary clamp-on ultrasonic flow meters enable operators to simply attach the transducer to the outside of the pipe – without any interruption to operations or any risk of leakage. As our products meet the highest requirements of industrial production, safety and the highest level of plant availability on the other operators can easily measure flow anywhere.

Ultimate Application Versatility

Designed for advanced process measuring in a variety of complex industrial applications, FLUXUS® has been setting the industry standard for non-invasive ultrasonic flow measurement for more than 30 years in both liquid and gas applications.

Additionally, PIOX® which stands for process analytics – offers non-invasive ultrasonic systems and wetted light refractometers.

The patented measuring method ensures stable measuring results, even in the event of temperature and pressure fluctuations in harsh process environments.

Applications

- Gas
- Liquid
- Steam
- High temperature

Key Differentiators

- Retrofit to your process
- Portable
- Ideal for corrosive media
- Flexible mounting
- Advanced analytics

Advanced Meter Verification

Advanced Meter Verification (AMV) allows you to check the health of your Flexim flow measurement device directly onsite without the need of process interruption. This flow meter verification solution saves cost while ensuring the performance of your non-invasive flow measurement.

Flexim Non-intrusive Permanent Ultrasonic Flowmeters



831, 721, 532

- 831 – High-performance flow meter for gas and liquids in hazardous areas
- 721 – High-performance flow meter for gas, liquids, and steam
- 532 – Cost-efficient flow meter for gas, liquids, and steam

G722 G721 G721CA



- High-performance flow meters for challenging and highly dynamic flow conditions and compressed air and technical gases

F722 F721 S721



- F721/F722 – High-performance flow meter for challenging and highly dynamic flow conditions
- S721 – High-performance mass flow, density, and concentration meter

H721 F721LF F721TE



- H721 – Hydrocarbon standard-volume flow and API determination meter
- F721LF – Extreme low-flow meter
- F721TE – High-performance thermal energy flow meter

Flexim Portable Non-Intrusive Liquid Ultrasonic Flow Meters

F601 F608



- 601 – High performance portable flow meter for gas, liquids, and steam
- 608 – High performance portable flow meter for gas and liquids in hazardous areas

Process Refractometers

R721/PIOX R/R500



- High performance refractometer for the measurement of concentration



Rosemount Vortex Flow Meters

Unmatched reliability, repeatability and accuracy



Unmatched Reliability

- No impulse lines, ports, or gaskets to improve reliability
- Unique all welded/casted, gasket-free design construction with no ports or crevices that can clog
- Mass balancing of sensor system and Adaptive Digital Signal Processing (ADSP) provide vibration immunity
- Device Diagnostics enable field verification of all meter electronics and sensor without process shutdown

Enhance Overall Safety

- Unique non-wetted sensor requires no bypass piping even in the most difficult process environments
- Eliminate the need to shut down the process during routine maintenance and meter verification
- CriticalProcess valve provides an extra level of safety assurance by allowing users to verify secondary containment integrity

Reduce Installation Complexity

- Flanged, wafer, weld-end connections to connection meet the needs of an application
- Widest selection of materials (SST, Nickel, Carbon Steel, and Duplex) to provide a tailored solution for any process challenge
- Standard and armored cables provide flexibility of remote mounting transmitters

Rosemount 8600 Vortex Flow Meters

8600 Utility Vortex Flow Meter

- Optimized for general purpose flow metering and utility applications including clean fluids and steam flow
- Enhanced reliability and simplified maintenance with superior vibration immunity without any moving parts



Rosemount 8800 Vortex Flow Meters

8800 Flanged Vortex Flow Meter



- Wide range of flange ratings available
- Ideal for all applications from general purpose to the most demanding application
- Up to ANSI Class 1500 pressure ratings for high pressure applications
- Ideal for injection applications

8800 Reducer™ Vortex Flow Meter



- Flanged vortex flow meter with reducing flanges integrated into the design
- Reduces cost by eliminating the need for field assembly of reduced piping
- Both Reducer and standard vortex have a common face-to-face dimension which allows the user to change the meter without impacting the piping layout or drawing

8800 MultiVariable Vortex Flow Meter



- Integral pressure and temperature sensors enable compensation
- Removable temperature sensor makes access and removal easy without draining the process piping
- Mass flow, volumetric flow or temperature are available as configurable outputs

8800 Weld-End Vortex Flow Meter



- Flange gaskets are eliminated by welding the flow meter directly into your process piping
- The only vortex flow meter available with zero potential leak points
- Ideal for applications where reducing potential leak points is important

8800 Dual/Quad Vortex Flow Meter



- Flanged vortex flow meter with redundant electronics and sensors
- Use for SIS and other applications where redundancy is critical
- Transmitters available with independent configurations

8800 Wafer Vortex Flow Meter



- Lightweight, cost-effective solution
- Easy installation with standard alignment rings
- Ideal for utility applications



Rosemount Magnetic Flow Meters

Highly accurate flow measurement solutions for a wide variety of conductive fluid applications



Reliability By Design

- Dual compartment Magnetic transmitter housing and all-welded sensor prevent moisture ingress and maintain safe local configuration

Industry-Leading Performance

- A temperature characterization and verification process for Magnetic transmitters minimizes the effects of ambient temperature changes

Valuable Diagnostics

- Smart Meter Verification for Magnetic flow meters continually monitors meter performance without stopping the process

Magnetic Flow Meter Overview

Magnetic flow meters, also known as electromagnetic flow meters or mag meters, are often selected because they are obstruction less, cost-effective, bidirectional, and provide highly accurate volumetric flow measurement.

Electromagnetic flow meters, or magmeters, are comprised of a transmitter and sensor that together measure flow. The magnetic flow meter's sensor is placed inline and measures an induced voltage generated by the fluid as it flows through a pipe. The transmitter takes the voltage generated by the sensor, converts the voltage into a flow measurement and transmits that flow measurement to a control system.

A range of liner materials, electrode options and line sizes accommodate a wide variety of process applications. For aggressive high noise applications, look to our Slurry Platform for optimum performance.

Rosemount Magnetic Sensor Portfolio

MS Slurry Sensor



A robust solution for difficult to measure applications such as sand, high solid content fluids, long pulp fibers, or installations that generate excessive process noise.

8705 Flanged Sensor



An all-welded design ensures reliability in the harshest environments. A wide range of sizes, liners, and electrode material options are available to meet most process conditions.

8750W Flow Meter



A reliable, robust design makes this utility magnetic flow meter system ideal for water, wastewater, and utility flow applications.

8711 Wafer Sensor



An economical, compact, and light-weight alternative to flanged magnetic flow meters with included alignment spacers for easy installation.

8721 Hygienic Sensor



Specifically designed for food, beverage, and pharmaceutical applications that require reliable, safe, and hygienic operation.

Liner Options



PFA, PTFE, ETFE



Polyurethane



Neoprene



Linatex

8782 Slurry Transmitter



The 8782 Slurry Transmitter is ideal for high noise applications where the highest levels of performance are required.

8732 Transmitter



This integral-mount transmitter with explosion-proof housing supports a variety of communication protocols and is available with Smart Meter Verification.

8712E Transmitter



This remote-mount transmitter has an easy-to-use LOI with dedicated configuration buttons, and is available with Smart Meter Verification.



Roxar Multiphase Flow Meters

Adjust for multiple flow regimes with performance monitoring and adaptive measurement capabilities



The Power of Performance Monitoring for Roxar 2600 Multiphase Flow Meters drives process insight and value directly at the wellhead.

The Roxar 2600 Multiphase Flow Meters (MPFM) accurately characterize flow regimes and provide critical information on a well's production capabilities. Built on a scalable technology platform, the advanced meter's signal processing and field electronics provide sensitive measurements and a comprehensive mapping of flow. Employ this modular meter to improve production optimization, flow assurance and well testing, while meeting all field conditions and cost requirements.

Automate Work Processes

- Collect diagnostic data from the meter and transfer the information to the Microsoft Azure cloud in real time, eliminating manual and timely processes for collecting data in the field.

Gain Actionable Insight

- Actionable insights from the Roxar 2600 Multiphase Flow Meters, enable proactive maintenance and help mitigate costly downtime.

Eliminate Uncertainty

- Reduce costly consequences associated with uncertainty in well data. With continuous remote monitoring, operators have the operational assurance they need to make informed decisions.

Access to Expertise

- Through the cloud environment the Emerson experts will monitor meter performance and provide recommendation of any actions required, reducing the need to build in-house competence.

Roxar Downhole Monitoring Solutions

Improving subsea well integrity with real-time monitoring of Annulus B pressure on subsea wells



Emerson's Roxar™ Downhole Wireless PT Sensor System - Annulus B allows the continuous monitoring of pressure and temperature in the B annulus of a sub-sea well. With this previously inaccessible data, the operator now has a unique opportunity to make informed well management decisions, enabling improved overall risk assessment, better well management and extended production up-time.

Key Benefits

- Real-time pressure and temperature data allowing for a more in-depth risk assessment of critical well barriers
- Simple to integrate, can use the same interface card, cable and wellhead feedthroughs as Roxar reservoir gauges
- High-integrity design with no casing penetration

Applications

- Subsea and TLP wells
- Production and injection wells
- Gas lift wells

Roxar Intelligent Multistage Completion Network™

Wireless interface enables connection to lower completions monitoring and control instrumentation



The Intelligent Multistage Completion Network™, an Emerson-Metrol partnership offering, offers a cost-effective solution to downhole monitoring in multistage completions. A permanent reservoir monitoring system is installed in the upper completion. The new Roxar Matrix Downhole Wireless Interface™ enables connection to Metrol wireless monitoring and control devices in the lower completion.

Key Capabilities and Performance

- High resolution temperature profiles from reservoir sections of the well
- Pressure and temperature data from multiple locations along the sand face
- Wireless control within the lower completion and along the sand face
- Online productivity data enabling selection of correct well management actions
- Permanent gauge installation providing life-of-well data

Applications

- Production and Injection wells with two-stage completions
- Subsea wells

PolyOil Solutions

PolyOil use a range of high impact wear resistant materials which by their unique processing methods make them the toughest available. The natural polymer properties make them low weight, safe and easy to handle and resiliency makes them kinder on all other equipment.



Anti-Jar Clamp - Subsea

- Acts as a safety device to prevent jar from cocking. It is light weight, easier handling than metal, benefits from a hinged design, and simple and fast to fit

Centralizer and Control Line Protector - Downhole

- Help get the casing to the depth of the well in long horizontal profiles by significantly reducing friction and drag, compared to metal clamps

Riser Sealing Mandrel & Cased-Wear Joint Poly-Wear Joint - Subsea

- Protect umbilical lines and increase safety on drilling rigs during completion and workover operations

Umbilical Protector Poly-Tector - Subsea

- Designed in-house to suit clients specification, being available in single or dual hinged design. It is simple and fast fitting, buoyant and counts on mid joint or cross coupling system



Rosemount Differential Pressure Flow Measurement Solutions

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 the 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, the 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



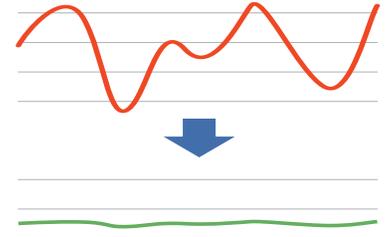
- Eliminate impulse lines and additional process penetrations with the Rosemount 405 Compact Flow Meter that mounts between existing flanges
- Reduce potential leak points by up to 70%

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 set point

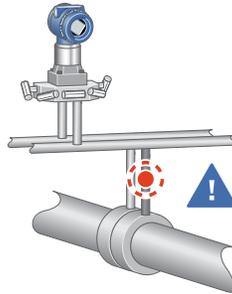
Increase visibility into process conditions and receive information when you need it most

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

Rosemount 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



- Highly accurate & reliable measurement
- Immune to most process conditions such as changing density, conductivity, temperature, pressure, viscosity, and pH
- Applicable to a wide range of applications with a broad selection of process connections, antenna styles, and accessories

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

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

Vibrating Fork



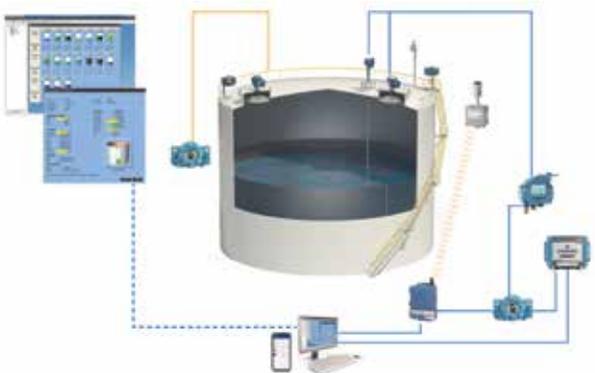
- Reliable high/low level alarms, overflow prevention and pump control
- Help prevent unplanned shutdowns with advanced diagnostics
- Fully integrated remote proof-testing

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



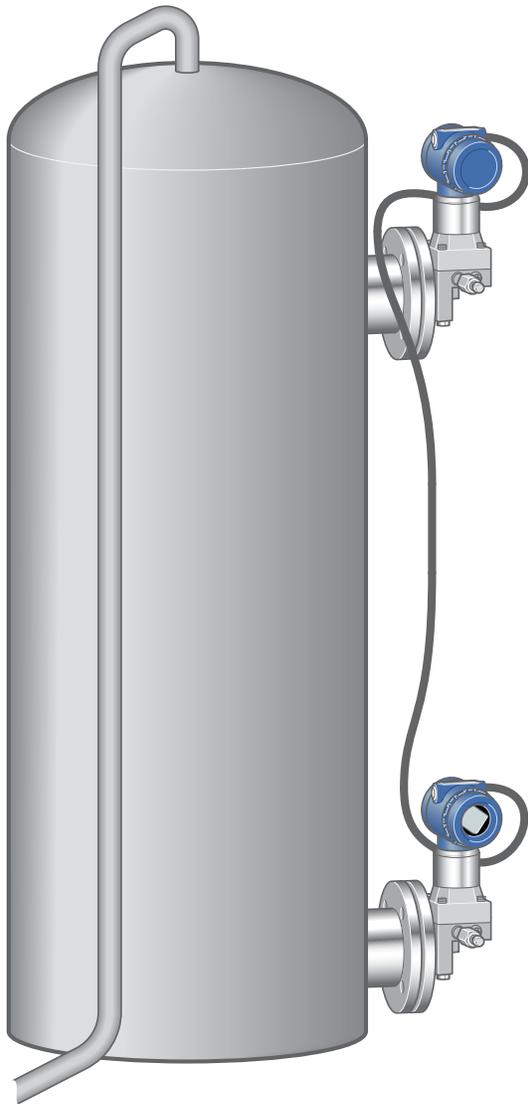
Inventory Tank Gauging



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

Rosemount 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, fill fluids, and materials

Improve Performance Using Advanced Technology

- For distillation towers and tall vessels, the Rosemount 3051S Electronic Remote Sensor (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%



"[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

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 Remote Seals
- Wide variety of seals and 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%

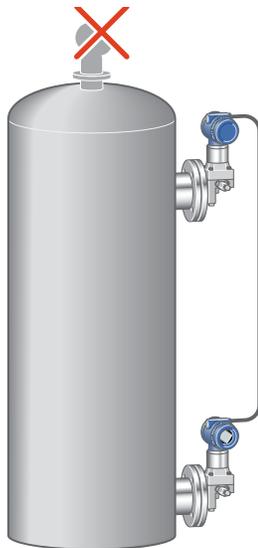
Reliability in Demanding Environments



- 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

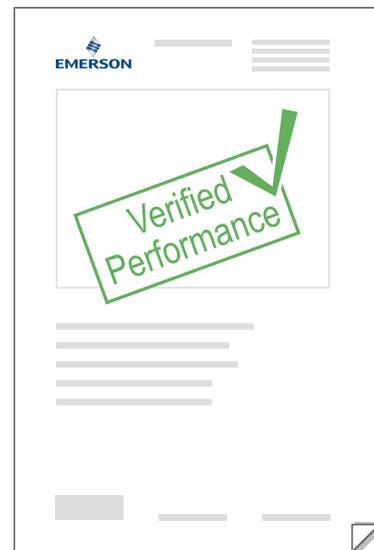
Gain enhanced process insight and confidence in your level measurements

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
- DP Level Sizing and Selection tool can generate performance reports for varying DP Level systems

Rosemount Flushing Rings

Faster, more efficient maintenance of DP level seal systems



Cleaner Diaphragm Seals, Faster

- Compact design cleans diaphragm seals up to five times faster over traditional methods
- Eliminate long process shutdown times
- Improve diaphragm seal surface cleaning, with injection flushing

Less Labor, Quicker Installations

- Pre-assembled valves - no need for multiple vendor piece parts
- Eliminate on-site assembly of components

Drastically Reduces Maintenance Time

- A simple way for maintenance staff to safely vent or drain excess pressure in the line
- A convenient method to access process fluid for sampling
- No removal of instrumentation or disassembly of process connections



Advantages For You

Flushing rings are a fast and efficient way to clean particulate buildup on diaphragm seals that can cause false pressure readings. You can eliminate expensive labor cost and long shutdown times by installing Rosemount 319 Flushing Rings.

Clean diaphragm seal residue up to five times faster than traditional methods.

Silicon Manufacturer Reduces Inventory Costs with 3051S Electronic Remote Sensor System (ERS)[™]



Customer

Chemical manufacturer in the United States

Application

Differential Pressure Level control in Silicon tanks

Challenge

Process engineers at a chemical manufacturing plant were having difficulties monitoring the inventory of a Silicon polymer-gel in their holding tanks. The gel was used in several products. When the control system indicated that holding tanks were full, engineers would proceed with the batch process. Due to measurement error, the amount of silicon gel was frequently not what was expected.

The problem stemmed from the inability to accurately monitor the level in the silicon holding tank. Instrumentation engineers had previously been using a DP level system with remote seals. Due to the

long length of capillaries, seasonal temperature variations could cause measurement errors of up to 5% of span.

The unreliable level measurement resulted in process downtime due to material shortages. The unreliable measurement also caused difficulty scheduling material purchases. Operations suffered from variable throughput due to material shortages. Additionally, the inconsistency of the process was increasing operations costs and scrap rates.

Solution

Instrumentation engineers at the chemical manufacturer updated the installation with a Rosemount 3051S Electronic Remote Sensor system. The 3051S ERS system consisted of two pressure sensors linked together digitally. Differential Pressure was computed in one of the two sensors and sent back to the DCS via a 2-wire,



The results

- Achieved better batch quality and throughput
- Reduced operation costs
- Minimized scrap rates



4-20 mA HART signal. The long lengths of capillary with the older installation were completely eliminated with the digital architecture of the ERS system. This eliminated the error caused by seasonal temperature variations.

This solution led to several positive business results. Process engineers were able to produce more consistent batches, improving quality and eliminating scrap. This led to lower operations cost. In addition, throughput was improved by eliminating unscheduled shutdowns due to material shortages.

The Rosemount 3051S Electronic Remote Sensor system allowed plant personnel to eliminate material shortages in holding tanks.



Rosemount 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 & 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.

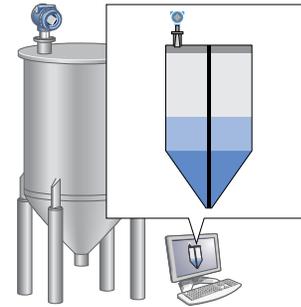
Engineered for ease-of-use

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

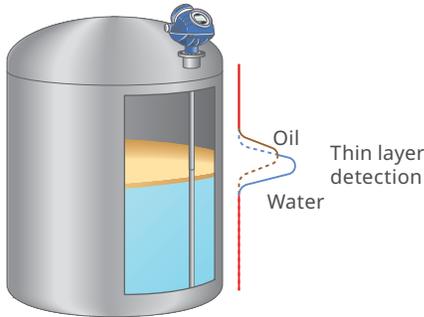
Easy to Operate Radar System



- 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

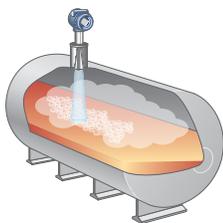
Accuracy and Robustness in Saturated Steam



- 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 Fast Sweep 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 2003 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

Rosemount 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 overflow 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

Rosemount Tank Gauging

Achieve high performance bulk liquid measurement



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.

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

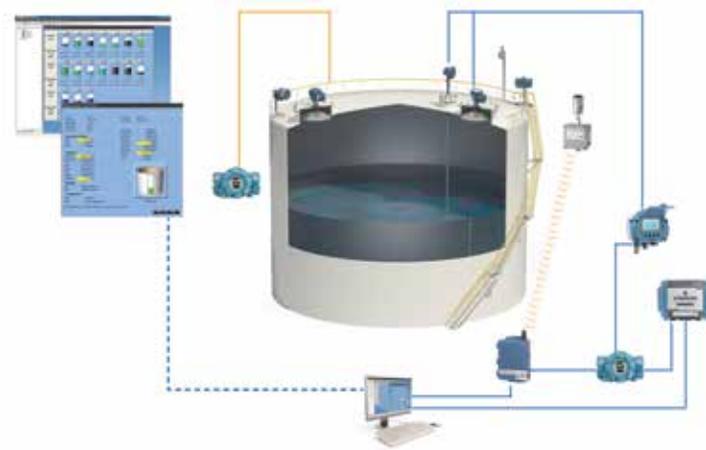
Control your inventory and custody transfer activities

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
- 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

Rosemount Temperature Measurement

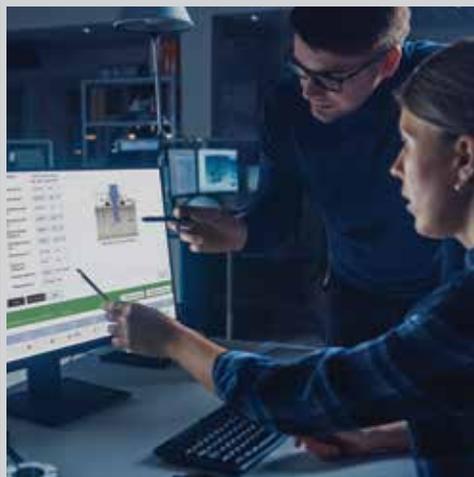
Obtain reliable temperature measurements to maximize operational efficiency



Tackle Challenging Applications

Temperature is the most measured variable in process industries and is often the most critical factor. Emerson's Rosemount Temperature portfolio is your one-stop shop for all your temperature assembly needs. These technologies enable you to improve operational performance by increasing safety, efficiency, throughput, and measurement accuracy.

- Choose the transmitter that meets your application needs from our comprehensive Temperature Transmitter Portfolio
- Minimize downtime and gain process insights by leveraging Advanced Diagnostics to protect against sensor failures and measurement disruptions
- Accurately measure process temperature without a thermowell with Rosemount X-well™ Technology
- Minimize the risk of thermowell failure in difficult process conditions with the Rosemount Twisted Square Thermowell



Turn 50 Hours of Design Time into 15 Minutes

Emerson's Rosemount Thermowell Design Accelerator automatically iterates thermowell design specifications to pass ASME standards.

- Saves up to 90% of design time vs conventional methods, automatically recalculating tags that fail
- Provides a systematic iteration history that's traceable and transparent for how calculations were performed
- Adheres to ASME PTC 19.3 (TW) standards
- Automatically verified Rosemount sensor and thermowell product models give procurement teams a quick and easy path to purchase

Gain trust with every communication

Temperature Transmitters



- Choose from a variety of form factors available for every industry and application
- Reduce infrastructure costs associated with high density measurements with dual- and multi-input transmitters
- Utilize Advanced Diagnostics to avoid process shutdowns due to failing sensors and maintain accuracy in non-ideal conditions

Get factory-tested, ready-to-install temperature assemblies

Temperature Sensors and Thermowells



- Ensure your sensors and thermowells are properly sized together
- Select from a wide variety of RTD and thermocouple sensors for any application and process environment for efficient and safe operations
- Precision manufactured thermowells available in a wide variety of mounting styles, process connections, and materials to meet all your application requirements

Avoid complexities of a thermowell assembly

Rosemount X-well Technology



- Non-intrusive solution eliminates need for pipe penetration, removing the potential for leaks and allows temperature points to be added without a process shutdown
- Proven algorithm allows for similar accuracy to traditional thermowell and sensor configurations
- Obtain temperature measurements on pipes with heavy slurry, high velocity flow, and caustic materials, as well as in extreme applications or process conditions

Increase reliability with reduced Vortex Induced Vibration

Rosemount Twisted Square™ Thermowells



- Simplify calculations by eliminating over 90% of dynamic stress - the number one source of thermowell fatigue failures
- Ease design efforts by reducing iterative calculations, saving time to install
- Allow for longer thermowells at higher velocities for more accurate temperature measurements



No cutting. No welding. No thermowells.

Rosemount X-well Technology Gives You Accurate Process Temperature Measurement Without a Thermowell



Rosemount X-well Technology uses an algorithm based on Fournier's Law that incorporates surface temperature, ambient temperature, and pipe characteristics. This allows Rosemount X-well Technology to calculate and output process temperature with similar accuracy to a traditional insertion thermowell and sensor configuration.

Cost Savings with Each Temperature Point

- Save up to 65% on engineering and design time by forgoing the wake frequency calculations and piping considerations needed with traditional thermowell installation
- Save up to 70% on installation and maintenance costs without the need to cut and weld the pipe and utilizing our Universal Pipe Mount one-size-fits-all solutions
- Through reductions in design, engineering, installation, and maintenance costs, you can save up to 30% on total cost of ownership

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



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. Each system of heat exchangers had five units, with three running the process and two off-line for cleaning and maintenance.

Emerson worked with the customer 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.

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

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



The results

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

"Rosemount X-well Technology with the Rosemount 648 Wireless Temperature Transmitter was commissioned in under an hour and seamlessly connected to the existing wireless infrastructure without process shutdown or production loss."

648 Wireless Temperature Transmitter, 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.



Rosemount Flame and Gas Detection

Help keep your people, assets and the environment safe



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 toxic and combustible gas releases
- Obtain accurate measurements with minimal false alarm disruptions

Benefit from Technical Expertise

- Emerson's experts are available to discuss latest flame and gas detection technologies and how they can be implemented in your facility
- 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 reduce capital expenses

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

Rosemount Liquid Analysis

Optimize operations with reliable liquid 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 transmitters and sensors for maintaining and controlling even the most demanding applications



"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**

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

High Temperature pH/ORP Sensor



- 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

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





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.



Liquid Analysis for Sanitary Applications

Liquid sensors and transmitters with rich online diagnostics provide insights that help streamline process performance by increasing throughput, minimizing waste, and improving quality for life sciences and 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.

Helps ensure water quality and regulatory compliance while controlling costs

Total Chlorine 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, transmitter, 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



- 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



Rosemount 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 Analysis products have 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
- 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 combustibles sensor provide accurate, reliable continuous measurement of combustion flue gases even 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



Rosemount 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 multiple 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 eight 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 X-stream 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 Quantum Cascade Laser (QCL) Gas Analyzer, which delivered the needed precision (0–20 ppm) with an NH₃



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.”

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.

Rosemount 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 eight 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 propellants 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.

Measurement Engineered Solutions

Reduce cost, risk, and complexity through one source



Get the expertise you need - in one trusted partner

Rely on Emerson to design a measurement engineered solution complete with automation and instrumentation that is able to meet your flow, analytical or sustainability needs over its entire lifetime.

- Implement a custom engineered or pre-engineered end-to-end solution that's right for your operation.
- Get the design expertise and technologies you need for success—all in one place.
- From concept to commissioning and beyond, Emerson's experts can help you not only design a more optimal system, but also execute it and provide the end-to-end support needed to keep it profitable.

Solutions for every challenge

The rigorous demands of your process operations require you to have reliable, accurate systems that give you the measurements you need - every time. Emerson understands the challenges and can help you with complete solutions for every flow measurement, analytical, and sustainability application.

- **Flow measurement systems:** Gas and liquid hydrocarbon custody transfer and fiscal metering systems that assure commercial and regulatory compliance
- **Analytical systems:** Gas and liquid analytical solutions that accurately quantify and manage your product quality
- **Sustainability and decarbonization systems:** Carbon capture, utility and storage (CCUS), hydrogen measurement and emissions monitoring solutions with customized configuration to meet carbon neutrality targets

Meet measurement accuracy requirements

Gas and Liquid Hydrocarbon Custody Transfer and Fiscal Metering Systems



- Achieve precise measurement despite varying operating conditions with dependable and seamless integration of all system components
- Minimize financial risk with reliable turnkey fiscal metering solutions that reduce overall system uncertainty and ensure regulatory compliance
- Ensure safe and reliable measurement of product flow with state-of-the-art technologies and proven flow measurement expertise

Ensure effective and efficient validation process

Proving Systems for Liquid Hydrocarbons



- Meet every installation need with tailored bi-directional ball provers and next generation compact provers
- Validate process meters across varying operating conditions with proven master meter systems
- Ensure the ongoing accuracy of your flow metering system and avoid audits with effective proving solutions

Enhance visibility to system health and reduce measurement uncertainty

Plantweb Advisor for Metrology



- Remotely monitor the health of your metering systems and integrated instruments anytime and anywhere with the latest IIOT technology
- Reduce time on site and ensure measurement confidence with intuitive dashboards that provide a bird's-eye-view of the health of all of your systems
- Ensure system reliability and contractual compliance using predictive diagnostics and automated reporting built upon industry standards

Improve quality and process control

Integrated Gas Analysis Systems



- Manage product quality with turnkey gas analysis solutions backed by more than 70 years of analytical expertise
- Full portfolio of probes, fast loop and sample handling systems, auxiliary instrumentation, and more than 100 analyzers and detectors
- Custom solutions with reliable long-term performance to help you control your process and accurately quantify your product

Control emissions to meet changing regulations

Continuous Emissions Monitoring Systems (CEMS)



- Reduce emissions and optimize energy use with cost-effective, pre-engineered and custom solutions
- Reduce risk of fines with highly accurate measurement from ppm to percent concentrations
- Rugged, compact systems enable installation closer to the sample probe, reducing cost and complexity

Ensure on-line measurement of your process liquids

Accurate Liquid Analysis Systems



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

Improve sustainability with cutting-edge engineered solutions

CO₂ and H₂ Metering Systems



- Address challenges like phase transitions, impurities, corrosion, and regulatory compliance for efficient CO₂ and H₂ transportation and storage
- Well suited for direct mass flow and purity measurement of gas, liquid, dense phase, and supercritical CO₂ and Hydrogen
- Comprehensive lifecycle care with expert evaluations to calculate measurement uncertainty and recommend improvements

Lifecycle Services, Project Management, and Workforce Training

A global network of service capabilities from your trusted partner



Emerson's global service network is the partner of choice for all your asset management needs. We employ innovative solutions to empower you in the field and help you maintain your competitive edge.

Our service offering extends beyond simple fix-and-replace activities:

- **Lifecycle Services** offers maintenance, reliability, and performance services – anytime, anywhere.
- **Project Management Services** can support you throughout your project duration, from plant concept to start-up.
- **Educational Services** can train your workforce throughout your plant life cycle and prepare them for any future changes.



We have the expertise and global resources to help you dependably define, execute and support a strategy throughout the lifecycle of your operation and ensure your workforce can meet the task.

Operate Safely, Consistently, and Economically

We provide you with service solutions that can help you solve your challenges, operate safely, improve your plant's reliability, and optimize your site's performance, which can help you increase profitability and realize the potential of your automation investment.

From start-up services to maintenance strategies, we partner with you to keep your plant running consistently and reliably to achieve your business goals.

- **Maintenance** Services help you get the technology and expertise you need to keep your process online
- **Reliability** Services help you consistently obtain accurate measurements, analysis, and diagnostics
- **Performance** Services help optimize plant performance to achieve business goals

One Less Project Risk

Expect your projects to proceed as planned as we manage your scope, schedule, budget, and align products to your 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 about new technologies and refining critical skill sets to maximize their performance.

Our courses are:

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



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



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