

Rosemount™ Level Measurement Solutions



The right technologies for optimal results



What if you could...

Make the right level measurement choice

Stay on schedule and reduce unplanned downtime

Increase the productivity of your plant

Trust that your operation is safe and under control

No single technology will cover all level applications; you need to determine what best suits your demands. Our global network of local instrumentation experts and our level guides will help you choose and implement the right level solution.



Staying on top of installation schedules is a challenge. Reliable Rosemount™ level instrumentation streamlines installation with factory commissioning, remote configuration and diagnostics, and simple set-up, eliminating repeated trips to the field.



From accurate specification to timely delivery, and with reliable products and expert technical support, we offer the resources and best practices to help you optimize your process.



To get the best out of your operation while also meeting strict safety regulations, you need reliable, leading-edge technologies. Emerson's deep industry knowledge, advanced diagnostics, and robust device designs stand up to the toughest measurement challenges.



“Availability requirements for this plant are 99.5%. There is no room for an unplanned stop. With instrumentation that works, you don't need to spend time worrying.”
– Benny Johansson, Terminal Manager, Skangas.

Find your solution

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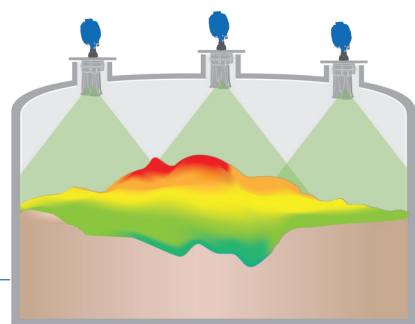
Level technologies that deliver accurate measurements across all your applications

Guided Wave Radar

Measurement is based on the time difference between sending and receiving a microwave pulse sent down a probe and reflected back to the media surface.

- + For level and interface measurement of liquids or solids
- + Suitable for wide range of temperature and pressure requirements
- + Top mounted
- + Unaffected by media density, viscosity, conductivity, turbulence, foam, and dust

► p6 & 36



Acoustic 3D Solids Scanner

An integral array of three antennas generates unique, dust-penetrating, low frequency acoustic waves which receive echoes from the media and measure the distance and direction of each echo.

- + For level and volume measurement of bulk solids with optional surface visualization
- + Low maintenance due to the self-cleaning antenna
- + Top mounted
- + Unaffected by media dielectric, particle size, conductivity or vessel size

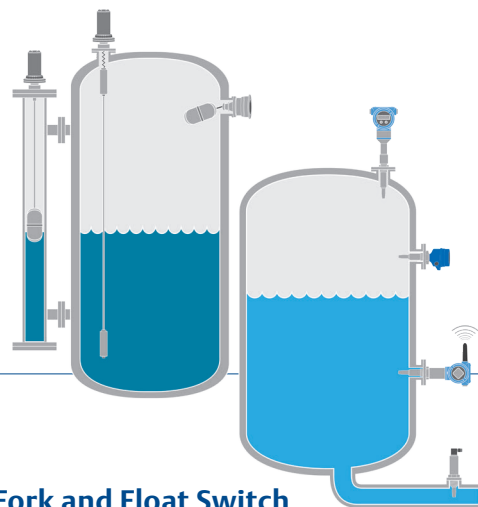
► p36

Non-Contacting Radar

A microwave signal launched into the tank is reflected back from the media surface. The level is derived from the time or frequency difference between the sending and receiving of the signal.

- + For liquid or solid tank levels with wide range of temperature and pressure requirements
- + Top mounted; can be isolated by valves
- + Unaffected by media density, viscosity, dirty coatings, and corrosiveness

► p10 & 36



Vibrating Fork and Float Switch

The vibrating fork oscillates at its natural frequency in air. When liquid covers the fork, reducing the frequency, the device output switches.

With the float switch, when liquid rises to lift the float, the magnetic coupling makes or breaks the circuit and the device switches.

- + For high and low alarms, overflow protection and pump control
- + Suitable for a wide range of pressure and temperature requirements for most liquids, including hygienic applications
- + Immune to changing process conditions
- + Flexible mounting

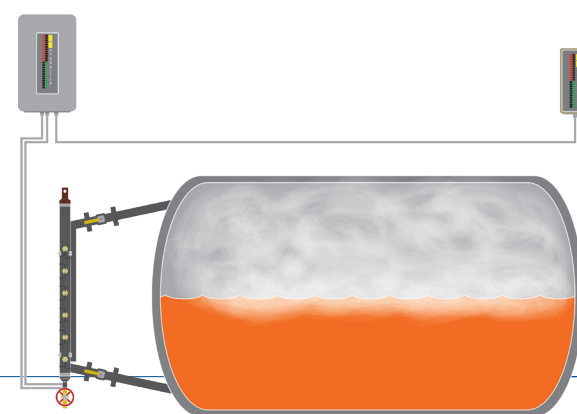
► p20 & 24

Differential Pressure

The level is derived from the density and a pressure measurement of the liquid's mass.

- + For liquid tank levels with wide temperature and pressure requirements
- + Flexible mounting; can be isolated by valves
- + Unaffected by vapor space changes, surface conditions, foam, corrosive fluids and internal tank equipment

► p14



Steam-Water Interface Level

A controller determines the steam-water interface level by measuring the electrical resistance of electrodes mounted in a water column connected to a boiler steam drum.

- + Ideal for condensate detection and turbine water induction protection
- + Highly reliable steam drum level
- + Side mounted and fault tolerant

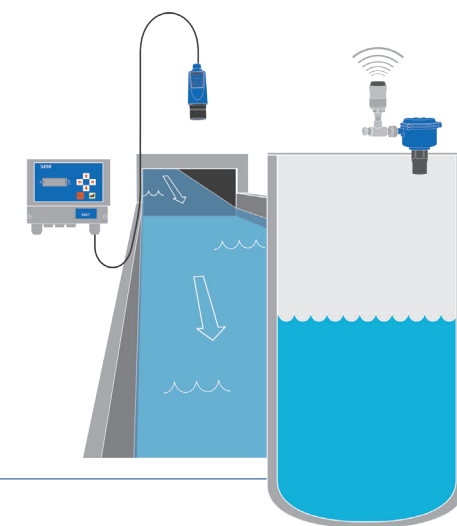
► p26

Ultrasonic

An ultrasonic pulse launched into the tank is reflected back from the liquid surface. The level is derived from the time difference between when the pulse was sent and received.

- + For simple tanks, open air and open channel flow
- + Top mounted and non-contacting
- + Unaffected by media density, viscosity, dirty coatings and corrosiveness

► p18

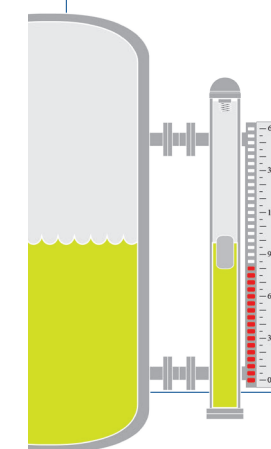


Magnetic Level Indicators

Measurement is based on visual level indication. A float rises and lowers with the fluid level which is shown by an external indicator.

- + Side mounted
- + For high-temperature, high-pressure and corrosive applications
- + Process liquid is not in contact with indicator glass

► p40

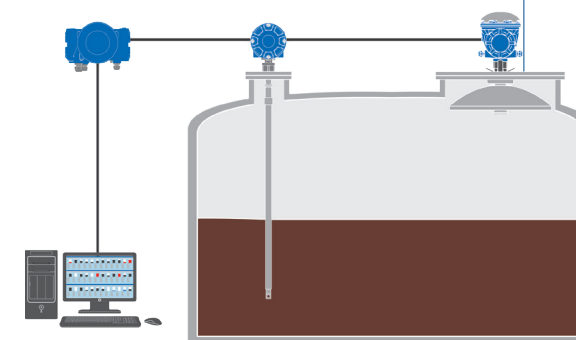


Inventory Tank Gauging

Complete tank gauging system solutions for tank terminals and refineries.

- + Reliable, non-contacting radar gauges with custody transfer accuracy
- + Suitable for a wide range of applications and tank types
- + Integrated tank instrumentation for high-performance results

► p28



Guided Wave Radar Level and Interface

Meet your toughest measurement challenges with our guided wave radars, which are easy to install into existing tank connections and are virtually unaffected by process conditions.

Rosemount Guided Wave Radar Transmitters

- Get highly accurate and reliable direct level and interface measurements
- Solve challenges of small vessels, difficult tank geometries, and internal obstructions
- Ideal for chamber applications and for replacing older technologies

Rosemount 5300: Superior performance

- Reliably handle challenging process vessels and applications with maximum control and safety
- Tap into microwave innovations for longer-distance measurements even with lower dielectric
- Streamline configuration and diagnostics through Radar Master and EDDL-based interface

Rosemount 3300: Versatile and easy to use

- Handle most liquid storage and monitoring applications with ease

Rosemount 3308: True wireless

- Ideal solution for your new or remote measurements with no wiring and easy commissioning
- Built on our proven technologies ensuring reliable performance
- Minimal maintenance and long-lasting nine-year battery life



Rosemount 5300

Rosemount 3300

Rosemount 3308



“Our condensate receiver levels went from being a constant headache to hardly noticeable because the Rosemount guided wave radar is so reliable.”
– Travis Rosenberg, Maintenance Manager, Absolute Energy, LLC

Specification and selection guide¹

		3300	3308	5300
Certification	Explosion proof or intrinsically safe	+	+	+
	Overfill protection (DIBt/TÜV WHG)	+	+	+
	Safety system certified to IEC 61508	-	-	+
	Marine approvals	-	-	+
Output	4-20 mA with HART [®]	+	-	+
	FOUNDATION™ Fieldbus	-	-	+
	MODBUS [®]	+	-	+
	IEC 62591 WirelessHART [®]	-	+	-
	IEC 62591 WirelessHART with Emerson™ Wireless 775 THUM™ Adapter	+	-	+
Configuration	Customized PC setup and support software	+	+	+
	AMS™ Suite / Field communicator (e.g. 375/475)	+	+	+
	DeltaV™	+	+	+
	DTM compliant	+	-	+
	Enhanced EDDL/DTM capabilities	-	+	+
Diagnostics	Standard diagnostic capabilities	+	+	+
	Enhanced diagnostic capabilities	-	+	+
Probe materials	Stainless steel or PTFE covered	+	+	+
	Duplex 2205, Alloy C-276, Alloy 400	+	+	+
Min/max temp/pressure	-40 to 302°F (-40 to 150°C) Full vacuum to 580 psig (40 bar)	+	+	+
	-320 to 752°F (-196 to 400°C) Full vacuum to 5000 psig (345 bar)	-	-	+
Performance	Maximum measuring range	75ft/23m	56ft/17m	164ft/50m
	Minimum dielectric constant with coaxial / single lead probe ²	1.4/2.5	2.0	1.2/1.4
	Reference accuracy	±0.2in/5mm	±0.12in/3mm	±0.12in/3mm
Challenging applications with single lead probe	Level and interface	+	+	+
	Coating products	-	+	+
	Disturbing electromagnetic interference	+ ³	+	+
	Turbulent hydrocarbons	-	-	+
	Saturated steam	-	-	+
	Solids	-	-	+

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FROM THIS:

Rethink your choices: move to single lead probes for more applications with our advanced guided wave radar, and enjoy reduced costs and maintenance

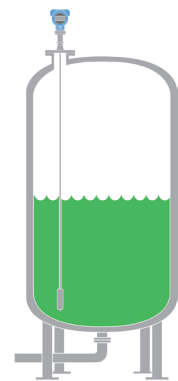


TO THIS:

¹ More information in product data sheet (PDS)
² See data sheets for details on how to measure on lower DK products
³ In metallic tanks. Consult factory in case of non-metallic tanks or open air applications

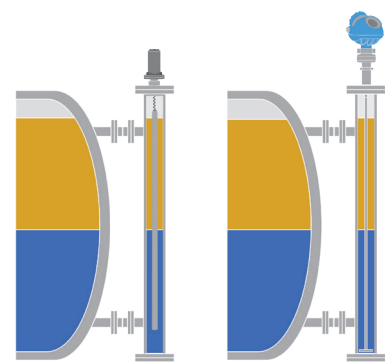
Applications

Industrial level measurement



- Get accurate measurement under process variations and across applications
- Withstands turbulence, vapors, coating, moisture, dust, foam, and geometrically difficult vessels

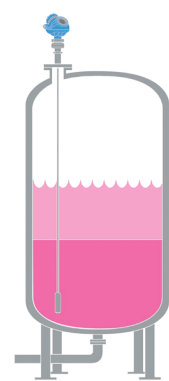
Technology replacement



From this → to this ... in minutes

- Easily install guided wave radar in existing chambers as a reliable, low-maintenance alternative to old equipment.
- Immune to density changes and no moving parts

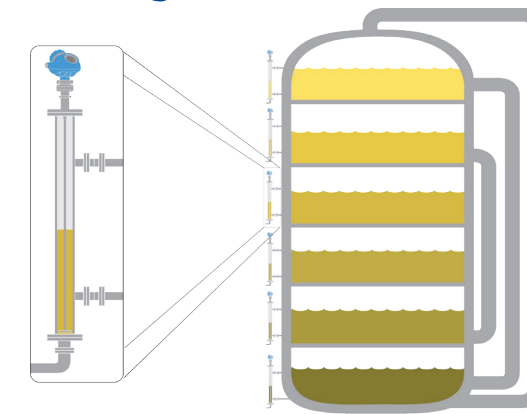
Interface and liquefied gases



- Measure the level and interface level in separators, settling and condensate tanks
- Good choice for liquefied gases such as LNG, LPG and anhydrous ammonia

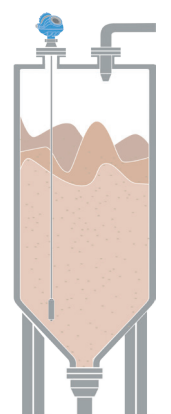
Applications

Demanding environments



- With the Rosemount 5300 series, you can manage low reflectivity, extreme temperatures and pressures, heavy product coatings, and saturated steam. It's a reliable alternative for distillation columns, feed-water tanks, and liquefied gases

Solids measurement



- Use the Rosemount 5303 to measure solids with ranges up to 160 ft/50m – for powders and granules, silicon, plastic pellets, cement, fly ash, corn, and more

Guided Wave Radar Level and Interface

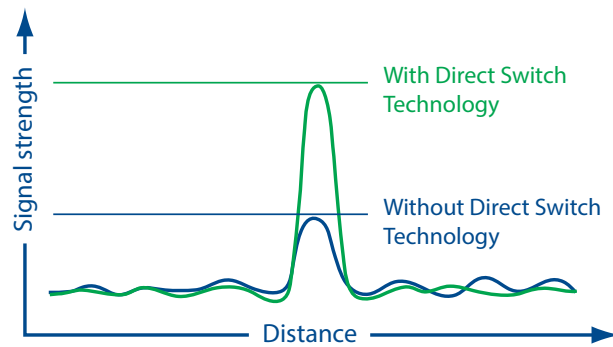
More capabilities, better results

Your job requires you to maximize safety, overcome challenging conditions and minimize costs, so you need instrumentation with unsurpassed capabilities. Use Rosemount Guided Wave Radar for real results in the most demanding applications.

Best performance and uptime

Leverage functions such as Direct Switch Technology to increase signal strength and Probe End Projection to improve measurement capability and reliability.

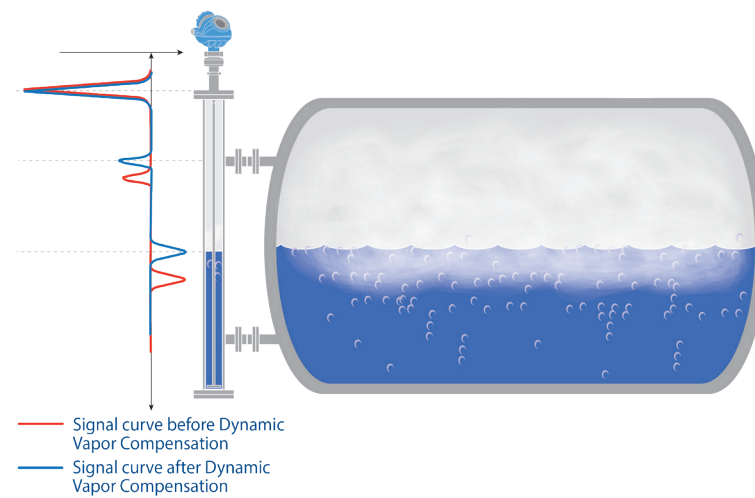
- Handle longer measuring ranges, obstructions, and lower dielectrics, even with a single lead probe
- Avoid downtime from interrupted process monitoring



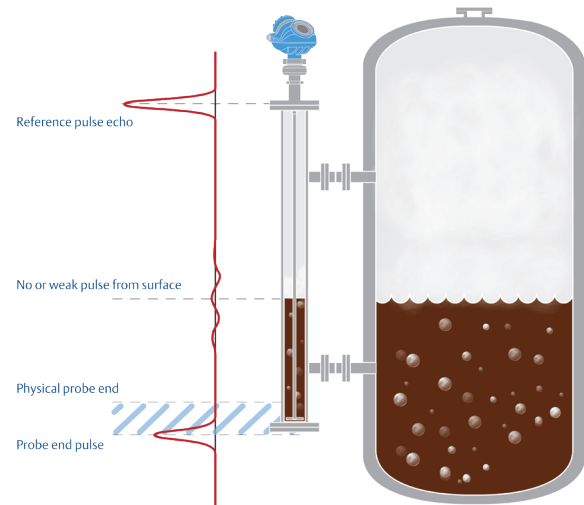
Direct Switch Technology provides a signal that is 2 to 5 times stronger than traditional technology

Accuracy in saturated steam applications

With our Dynamic Vapor Compensation option, you can compensate for changes in the vapor space dielectric, minimizing accuracy errors associated with varying pressure and/or temperatures while improving plant efficiency.



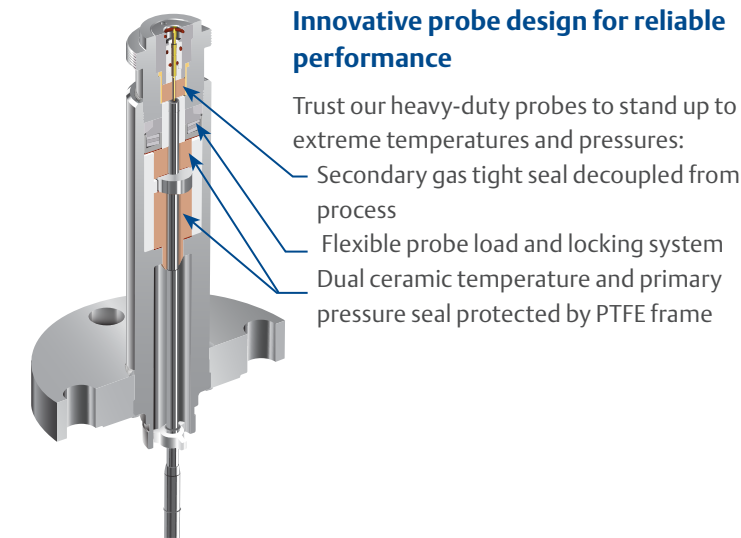
The steam dielectric is measured by using a vapor probe with a reference reflector



With Probe End Projection, the surface position is calculated when the surface echo is unavailable



“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



Innovative probe design for reliable performance

Trust our heavy-duty probes to stand up to extreme temperatures and pressures:

- Secondary gas tight seal decoupled from process
- Flexible probe load and locking system
- Dual ceramic temperature and primary pressure seal protected by PTFE frame

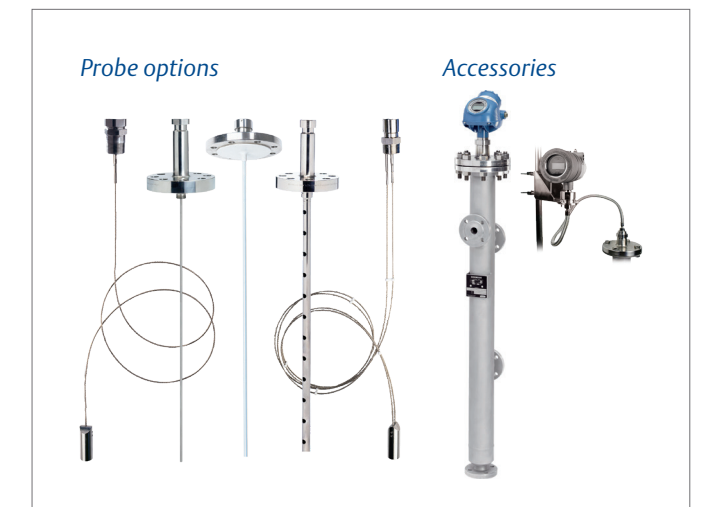
Lower maintenance costs

Use our Signal Quality Metrics diagnostic suite for alerts on when to clean the probe before your measurement is at risk.

- Detects abnormal process conditions such as antenna coating or foam
- Helps to plan preventive maintenance and avoid process upsets/shutdowns
- The metric can be configured as an output variable through Radar Master and DD/DTM™

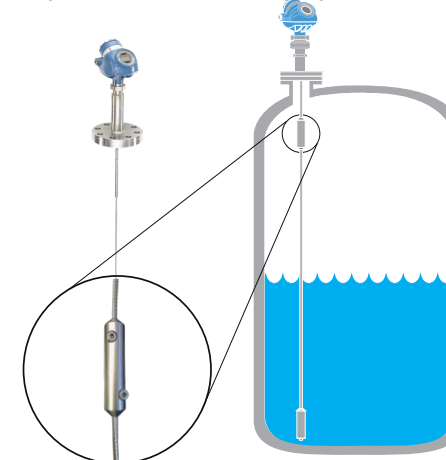
Increased safety

Our Smart Galvanic Interface and enhanced transient protection design provides improved protection from Electro-Magnetic Interference. Also, your ability to detect overfill is enhanced with our EchoLogics and smart software. The Rosemount 5300 Series Guided Wave Radar is third-party approved (DIBt/WHG) for overfill protection and certified for Safety Integrated Systems.



Remote proof-testing using Rosemount 5300 Series with Verification Reflector

The Verification Reflector provides a unique solution to quickly and safely test your transmitter's integrity



- Remote proof-test
 - Quick and safe remote transmitter integrity checks
 - Verifies the transmitter in situ and remotely from the safety of your control room
 - No need to climb the tank or manually raise the product level
- Continuous supervision
 - Alerts if any issues are identified with transmitter health
 - Ensures safe operation between tests



Modular design reduces spare parts and allows you to replace the head without opening the tank

Non-contacting radar level

When you need simple, top-down installation and commissioning along with trouble-free operation, non-contacting radar level is your best choice. Use it for a wide range of process applications, including dirty and corrosive media.

Rosemount Non-Contacting Radar Transmitters

- Highly accurate and reliable direct level measurement for liquids or solids
- MultiVariable output with level, distance, volume and/or signal strength
- Immune to changing density, conductivity, temperature, pressure, viscosity and pH
- Compatible with a wide selection of materials, process connections, antenna styles and accessories

Rosemount 5408: designed for ease of use

- Two-wire fast-sweep FMCW technology optimized for best sensitivity in process applications
- Measures level with ±0.08 in. (2 mm) instrument accuracy over 40m (130ft) measuring range
- Designed to simplify operator tasks with pictorial instructions and an intuitive software interface
- Ideal for solids applications

Rosemount 5400: 2-wire pulsed

- Market-leading signal software logic manages dynamic tank environments
- High and low frequencies available for maximum application coverage
- Enhanced EDDL-based interface for visualizing configuration and diagnostics
- Suitable for solids applications

Rosemount 5900S: for inventory and custody transfer

- Highest accuracy for inventory and custody transfer for various tank types and media
- 2-in-1 gauge option for cost-efficient redundancy

For more detail see page 28



Rosemount 5408

Rosemount 5400



Rosemount 5900S

“We’re always looking for ways to improve our operating efficiency, and this Rosemount radar gauge is moving us in the right direction.”
- NA Pulp and Paper Mill, Pulp Mill E & I Supervisor



Specification and selection guide¹

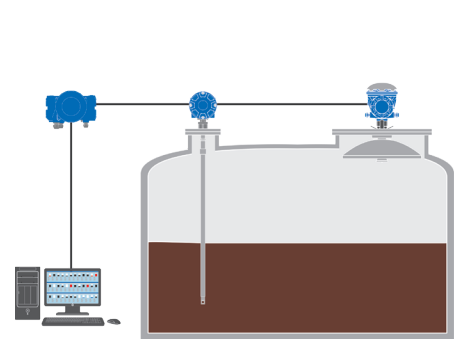
		5400	5408
Certification	Explosion proof or intrinsically safe	+	+
	Overfill protection (DIBt / WHG)	+	+
	Safety system suitable through Prior-use	+	+
	Safety certified to IEC 61508	-	+
	Marine approvals	+	+
Output	Separate wiring for power and communication (e.g. 4-wire)	-	-
	4-20 mA with HART	+	+
	FOUNDATION Fieldbus	+	-
	MODBUS	+	-
	WirelessHART with THUM Adapter	+	+
Configuration	Customized PC setup and support software	+	+
	AMS Suite / Field communicator (e.g. 375 / 475)	+	+
	DeltaV	+	+
	DTM compliant	+	-
	Enhanced EDDL capabilities	+	+
Diagnostics	Standard diagnostic capabilities	+	+
	Enhanced diagnostic capabilities	+	+
Antenna materials	Stainless steel, Alloy C-276, Alloy 400	+	+
	PTFE	+	+
Min/Max temp/ pressure	-40 to 302°F (-40 to 150°C) Full vacuum to 232 psig (16 bar)	+	+
	-76 to 482°F (-60 to 250°C) Full vacuum to 1450 psig (100 bar)	-	+
Performance	Maximum measuring range	115ft/35m	131ft/40m
	Minimum dielectric constant	1.4	no min
	Reference accuracy	0.12in/3mm	0.08in/2mm
Application considerations	Heavy vapors or bubbling / boiling surfaces	+	+
	Valves, taller nozzles, small openings and internal structures	+	+
	High turbulence and rapid level changes	+	+
	Solids, granules, powders	+	+

KEY: + Available - Not available

¹ More information in product data sheet (PDS) tanks or open air applications

Applications

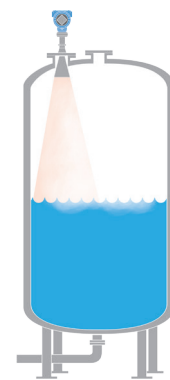
Bulk storage tanks



- For inventory tank gauging and custody transfer, the Rosemount 5900S Radar Gauge, used with the Rosemount tank gauging system, is the superior solution for safe and efficient operations

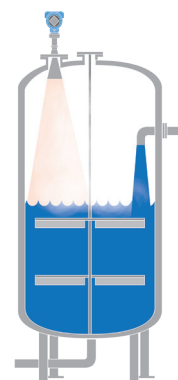
▶ p28

Storage and buffer tanks



- Use Rosemount Non-Contacting Radar for highly reliable and accurate level readings with no moving parts or product contact - eliminating costly maintenance and improving safety

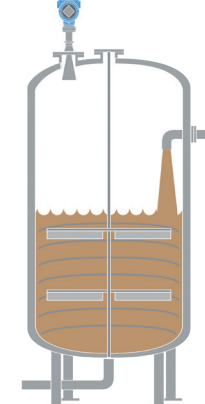
Demanding environments



- Minimize the effects of vapor gas mixtures, temperature, pressure, and other challenging conditions, and get reliable measurements with corrosive media such as caustics, acids, and other chemicals

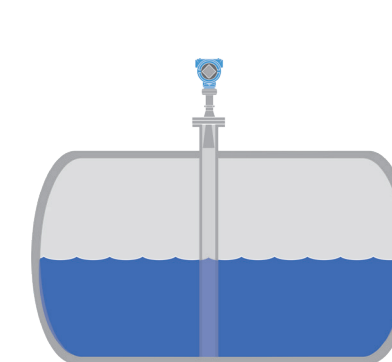
Applications

Reactor and mixing tanks



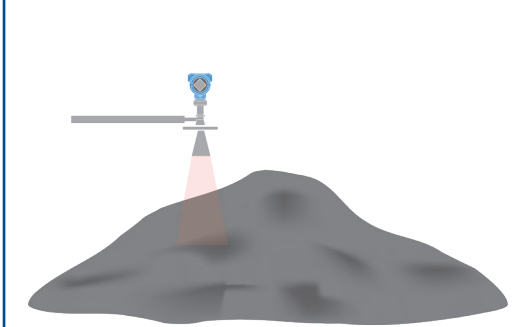
- Withstand the rigors of reactor and mixing tanks with Rosemount Non-Contacting Radar. Easy to install and commission, it's also unaffected by virtually any fluid property change, including density, pH and viscosity

Pipes and stilling wells



- Stilling wells minimize the impact of foam, turbulence and internal tank structures by making them invisible to the radar because the signal is confined within the stilling well. Non-contacting radar is an ideal product to use in this application

Open air applications



- Rosemount Non-Contacting Radar meets regulatory requirements for open applications. It delivers reliable level measurements of sumps, ponds, or solids gathered in open piles, regardless of challenging weather conditions such as changing temperature and wind

Non-contacting radar level

Profit from technological innovation

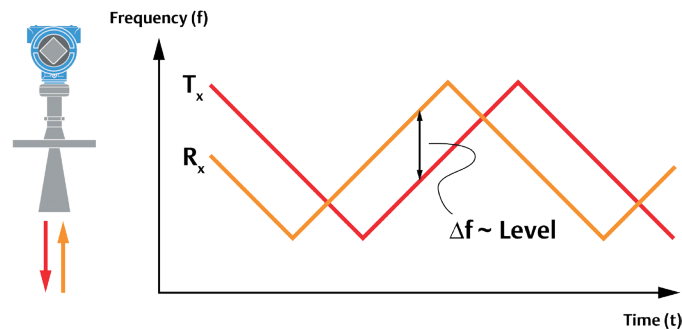
Improve the efficiency of your operation with high-performance Rosemount Non-Contacting Radar technologies, which use advanced radar signaling to generate reliable measurements that optimize your process.

Ultimate performance, by design

Frequency Modulated Continuous Wave Technology

Using game-changing 2-wire Frequency Modulated Continuous Wave (FMCW) technology for a continuous measurement, the Rosemount 5408 is 30 times more sensitive than traditional pulsed 2-wire non-contacting radars.

The result is a maximized signal strength producing a more robust and reliable measurement, with a better ability to manage process conditions that only give weak echoes - such as foam, turbulence, and condensation. Near zone measurement becomes clearer and the device is better able to discern the surface from nearby obstacles.



A constant stream of radar waves makes the Rosemount 5408 Radar Level Transmitter 30x more sensitive.

Improved process uptime with advanced transmitter power diagnostics



The Rosemount 5408 gives reliable performance even if loop power is compromised, due to its low energy requirements, coupled with diagnostics to ensure you don't run out of power.

- Energy efficient unique radar chip with only 12 Volt lift off
- Embedded power reserve keeps the device self-powered for up to 2 seconds, making it immune to intermittent power losses

Right antenna at the right time

Cone antenna

The most versatile antenna, suitable for most applications and available in many different materials, such as stainless steel, Alloy C-276, Alloy 400 and PTFE. When using the air-purging option, this antenna is a good choice for solids measurement.

Process seal antenna

The process seal antenna offers a drip-off sealing disk design that is insensitive to condensation, dirt, and build-up. Only corrosive-resistant, non-metallic materials are exposed to the tank atmosphere. It comes in two different versions, flanged or tri-clamp. The flanged option is the perfect choice for corrosive media or when condensation is present. The tri-clamp option is hygienically certified.

Parabolic antenna

Perfect for long ranges and can also be used on solid materials.

Antenna options



“Since the installation, both operational and maintenance costs have been reduced.”

– Johnny Lundberg, Project Manager, Casco Adhesives



Experience a new ease of use

The Rosemount 5408 is designed to be the easiest to use radar on the market. It was developed together with actual users to ensure that the product is optimized for ease-of-use at every touch point.

Installation made easy

With the user-friendly Rosemount 5408, you get the instructions when and where you need them. The manual is designed using image based instructions to make it easy to understand for inexperienced users.

Configuration in a dynamic software environment

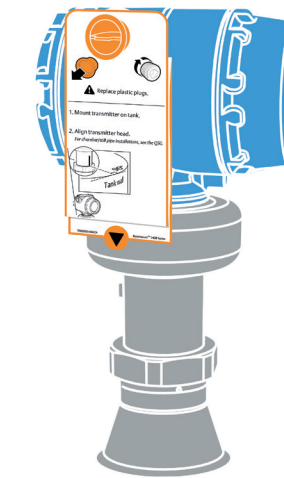
The Rosemount 5408 is easy to integrate into your system and intuitive to use. Configure your device using the dynamic software environment offered by Rosemount Radar Master Plus. Rosemount Radar Master Plus is FDI compliant and allows both basic and advanced configuration without proprietary standalone software.

- Rosemount Radar Master Plus has an intuitive setup with dynamic and informative graphics to aid inexperienced users
- All alerts follow the NE 107 standard

Preventative maintenance with Signal Quality Metrics

Signal Quality Metrics functionality monitors the relationship between the surface echo, surface threshold, and noise level in the tank

- Detects abnormal process conditions such as antenna coating or foam
- Helps to plan preventive maintenance and avoid process upsets/shutdowns
- Signal quality can be configured as an output variable through Radar Master



Pictorial user instructions are attached to the housing

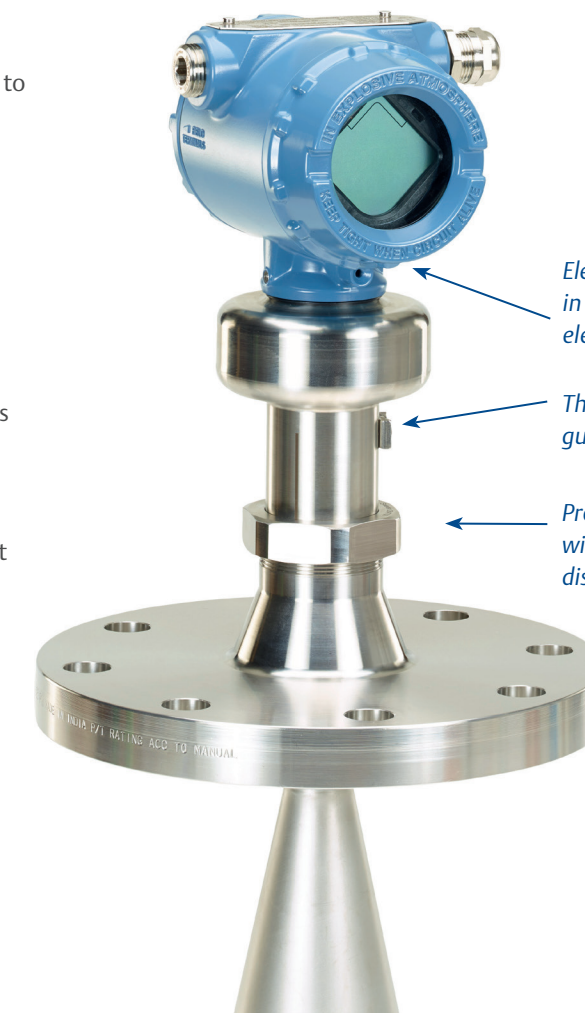
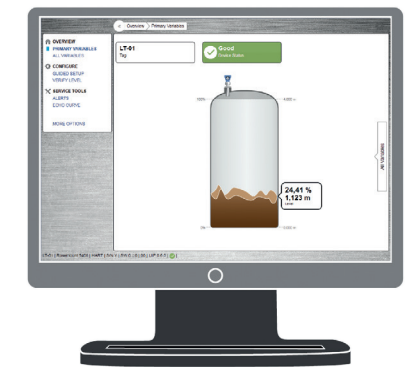
Measurements that you can trust

Incorrect readings are a problem if the radar device recognizes the wrong level. The Rosemount 5408 provides superior tracking capabilities with greater resolution, stronger echo, and a measurement supervision function to prevent incorrect readings.

No more guessing what happened

The Rosemount 5408 provides a built-in historian that allows you to go back seven days to see what has happened during a specific event, providing troubleshooting data and process insights.

- Seven days of stored data enables analysis of measurements, alerts, and echo profiles
- View echo curve from the time of the event



Electronics and cable connections are located in separate compartments, protecting the electronics and making handling safer

There are markings on the transmitter to guide the user when installing it

Proof-testing is easy and safe to accomplish without requiring removal of the unit, disconnection of wiring, or changes in level

Differential Pressure and Hydrostatic Level Transmitters

Use Rosemount differential pressure level transmitters in more ways and places than ever before with best in class remote seals, Electronic Remote Sensors and the latest innovations in wireless technology.

Rosemount Liquid Level Transmitters

- Combine world-class Rosemount pressure instrumentation with direct-mount seals
- Tuned-System™ Assemblies enable cost-efficient measurement in closed-vessel applications

Electronic Remote Sensors

- Innovative digital architecture - using two Rosemount 3051S pressure sensors - eliminates excessive impulse piping and capillary
- MultiVariable capabilities offer added, in-depth process insights

Rosemount Thermal Range Expander

- Enables DP Level systems to be direct-mounted on processes operating up to 410°C (770°F) and with design temperatures up to 454°C (850°F)
- Provides repeatable, reliable measurements over a wide range of ambient temperatures, eliminating the need for heat tracing

Rosemount 1199 Seal Systems

- A comprehensive offering of seals, fill fluids, and materials that allow you to connect to virtually any process
- Extend instrumentation life in high-temperature, corrosive, highly viscous, and other problematic applications

Hydrostatic Level Transmitters

- Submersible or external — for use in vented or open tanks
- Tough, flush-mounted ceramic sensor yields longer life
- Available for top-down installation in wells and sumps



Rosemount 3051S

Rosemount 3051S Electronic Remote Sensor (ERS™) System

Rosemount 1199 Seal Systems

Hydrostatic Transmitter

“Rosemount 1199 seal assemblies increased our service life from less than two months to more than three years.”
 – Instrumentation Engineer, U.S. Paper Mill

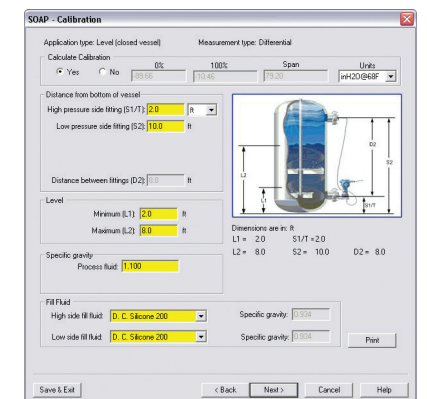
Specification and selection guide¹

		3051S ERS	3051S	3051	2051	Hydrostatic
Transmitter protocols	4-20 mA	+	+	+	+	+
	HART	+	+	+	+	-
	FOUNDATION fieldbus	+	+	+	+	-
	WirelessHART	-	+	+	+	-
	WirelessHART with the THUM Adapter	+	+	+	+	-
	PROFIBUS®	-	-	+	-	-
Available measurements	Low power (1-5 Vdc)	-	-	+	+	-
	DP level, P-Hi pressure, P-Lo pressure, P-Hi module temp, P-Lo module temp 20-point scaled variable	+	-	-	-	-
	DP level / Pressure, process temperature, module temp, 2-point scaled variable	-	+	-	-	-
	DP level / Pressure, module temp 2-point scaled variable	-	-	+	+	-
	Hydrostatic level	+	+	+	+	+
Additional transmitter options	Remote display and interface	+	+	-	-	-
	Advanced diagnostics	-	+	-	-	-
	Safety certified to IEC 61508	-	+	+	+	-
Process temperature	-4 to +194°F (-20 to +90°C)	+	+	+	+	+
	-157 to +698°F (-105 to +370°C)	+	+	+	+	-
	-157 to +770°F (-105 to +410°C)	+	+	-	-	-
Process pressure	Up to 10000 psi (689 bar)	+	+	+	+	-
	Up to 15000 psi (1034 bar)	-	-	+	-	-
	Up to 656 ft (200 m) hydrostatic level	-	-	-	-	+
Materials of construction	15+ available including 316 Stainless steel, Tantalum, Alloy C-276, Titanium, gold plated, and PTFE coated	+	+	+	+	-
	316 Stainless steel or aluminium bronze and ceramic capacitive sensor	-	-	-	-	+

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Instrument Toolkit™ Software ensures correct device specification

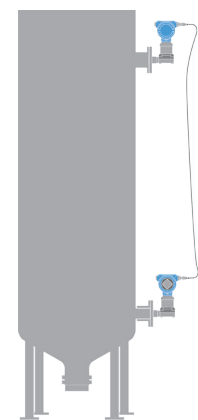
- Ensure the right differential pressure level technology is specified for each application
- Optimize performance by validating the seal configuration for your application
- Reduce risk with an industry first remote seal system performance report



¹ More information in product data sheet (PDS)

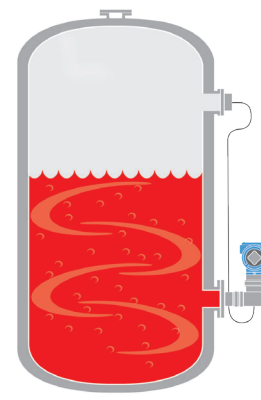
Applications

Tall vessels and towers



- Leverage the digital architecture of the Rosemount 3051S Electronic Remote Sensor (ERS) System to eliminate measurement drift, plugged impulse lines, and other performance issues common in tall vessels and distillation towers

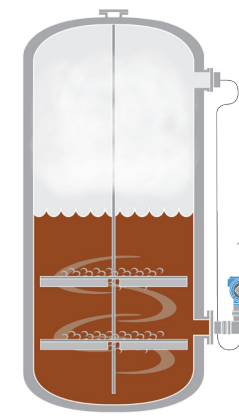
Demanding environments



- Tackle extreme temperatures, hard vacuums, corrosive processes, and other tough applications with ease by tapping into our wide variety of differential pressure level configurations

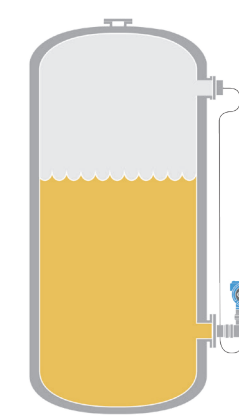
Applications

Liquid and slurry measurement



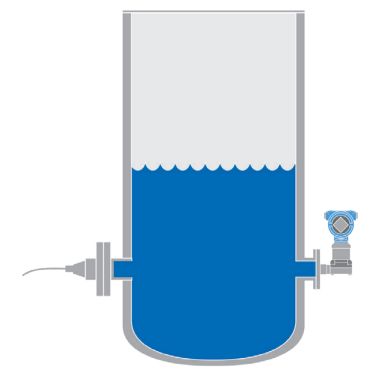
- Use differential pressure level technology for virtually any liquid application, including those with foam, agitation, and other tank disturbances

Hygienic applications



- Trust our transmitters and seals — available with required fill fluids and process connections, for critical hygienic applications, including 3-A®

Vented tank and sump measurement



- Use hydrostatic or differential pressure level technology for precise, stable readings in open sumps and atmospheric pressure tanks — either within or outside the tank and even in difficult surface conditions

Differential Pressure and Hydrostatic Level Transmitters

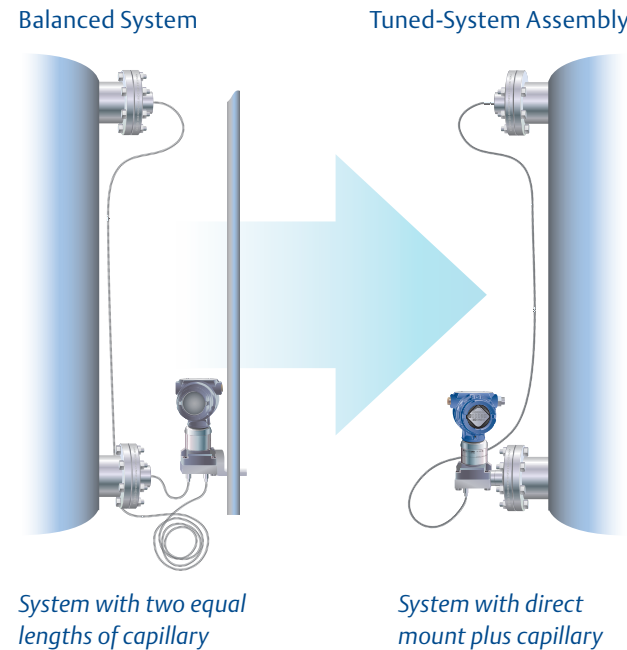
Optimizing across applications

Keep your operation optimized — across any application — with state-of-the-art Rosemount level technologies, including best-in-class pressure transmitters, Rosemount 1199 Remote Seals and innovative installation practices.

Tuned-System Assemblies: an easier, cost-effective measurement

Ideal for applications with shorter spans and higher operating pressures, Tuned-System Assemblies deliver improved performance at a lower cost compared to a traditional balanced system.

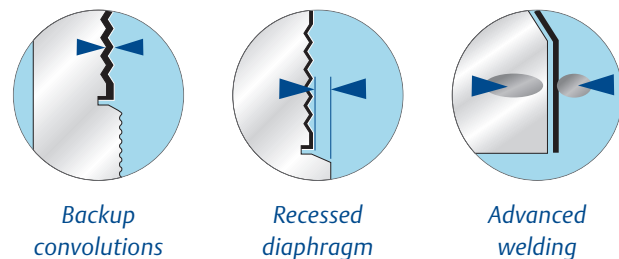
- Reduce costs 20% with an easy-to-install, direct-mount assembly that eliminates excess capillary and transmitter mounting hardware
- Improve system performance by 30% and time response by 80% by removing excess capillary and oil volume
- Use up-front, quantified performance reports to reduce risk with model selection and project execution



Rosemount Seal System: designed and built to last

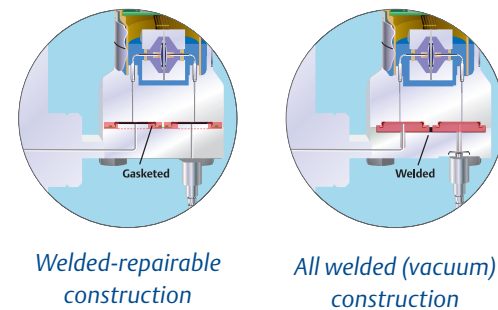
Robust seal design

- Diaphragm's backup convolutions minimize oil volume, enhancing measurement reliability
- Recessed diaphragms reduce potential for handling damage
- Advanced welding techniques protect the integrity of exotic-material diaphragms



Rugged system construction

- Welded design with no threaded connections
- 100% helium leak tested
- Superior manufacturing techniques ensure system is air-free, leak-tight and stable over time
- Delivers proven, powerful operation in full vacuum applications



Rosemount Thermal Range Expander

Two diaphragms allow the use of two separate fill fluids

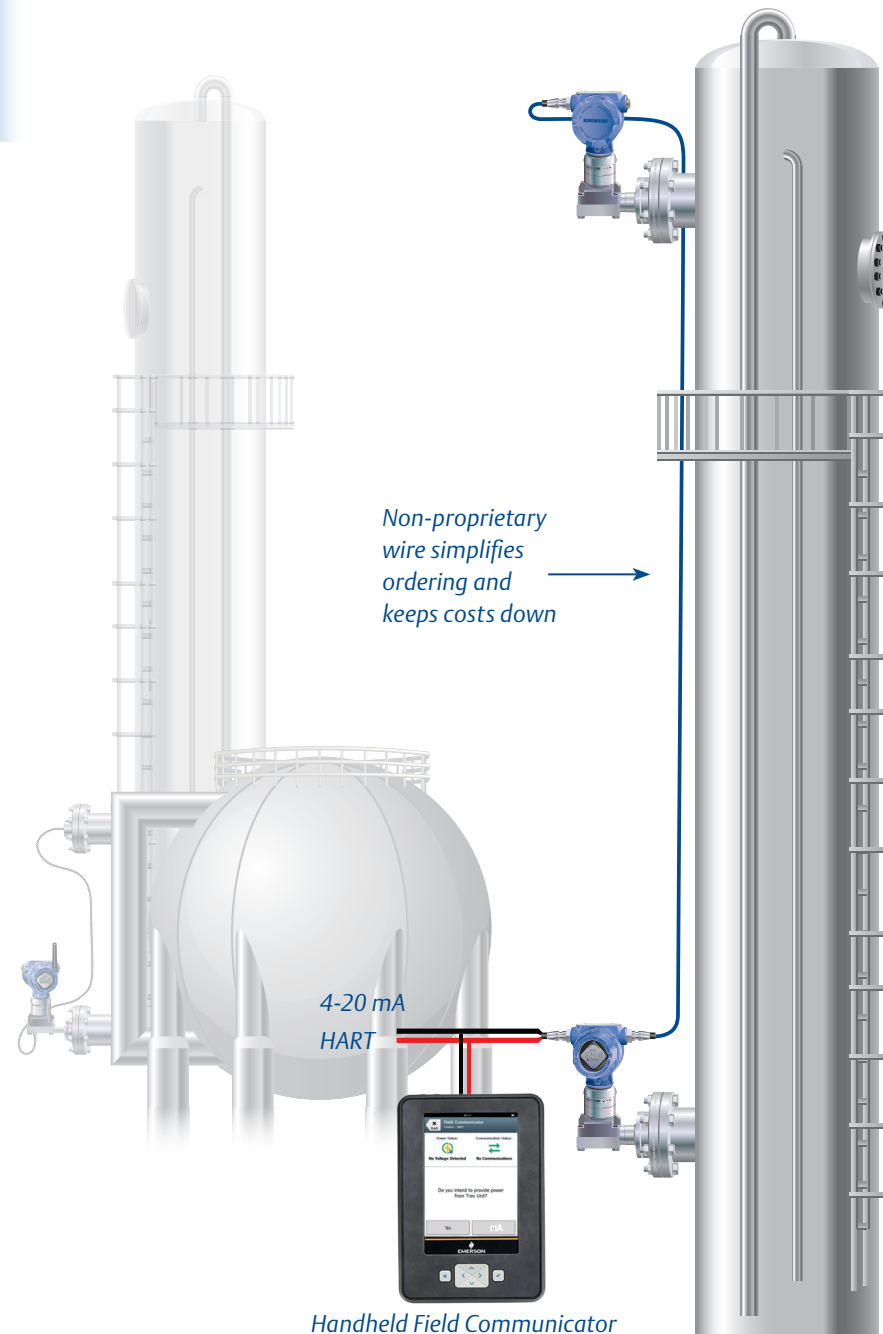
- The device utilizes a high-temperature fill fluid to handle the hot process, and a different fill fluid to handle the ambient environment
- Available on all 3051SAL technologies including Rosemount 3051S ERS Systems, Tuned-System Assemblies, Balanced Systems, In-Line and Coplanar™ direct mount or remote mount configurations

“ We have had no lost production and better on-stream operation since installing Electronic Remote Sensors.”
– I&E Reliability Team Leader, U.S. Petrochemical Facility



Rosemount Electronic Remote Sensors: A digital upgrade to a proven technology

The Rosemount 3051S ERS System is a best-in-class, digital solution for distillation towers, tall vessels and other applications that require excessive impulse piping or capillary. But it's still based on the differential pressure level measurement your crews know and trust.

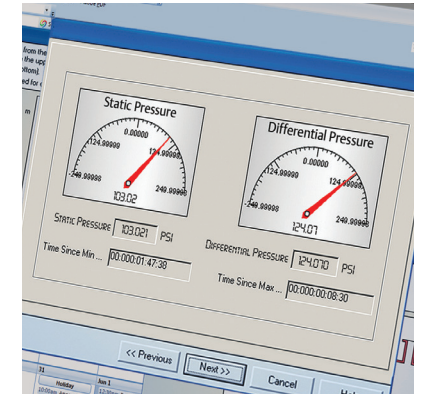


Expand your application success



Simplified installations

Each sensor can be independently installed, and the non-proprietary connecting wire can be fed through catwalks and around hazards.



Greater process insight

In addition to calculating differential pressure measurement, you'll get pressure and temperature readings from each sensor module, giving you greater process insight.



Streamlined maintenance

The Rosemount 3051S ERS System replaces mechanical components with a digital architecture free of heat tracing, insulation, and other complicated practices.



Easy integration

The entire system is preprogrammed and powered from a single 2-wire, 4-20 mA HART loop for easy setup and integration.

Ultrasonic Level Transmitters

To run at your full potential and maximize process control, you need reliable level instrumentation throughout your facility. Rosemount Ultrasonic Level Transmitters are your cost-effective solution, while our market-leading water and effluent treatment instrumentation ensures environmental compliance and efficient operation.

Rosemount Ultrasonic Level Transmitters

- Fast fit and commissioning for reduced start-up costs
- Minimal maintenance costs with non-contacting technology
- Ideal for level, volume or open-channel flow applications
- 2-wire loop powered with Intrinsic Safety (IS) hazardous area certification
- Routine level measurement up to 40 ft. (12m)
- Local Operator Interface or remote programming
- Inert wetted materials for use with corrosive liquids
- Sealed type 6P/IP68 version offers protection during flooding
- Easy configuration using Rosemount 3490 controller, field communicator or AMS

Sludge Blanket Level and Suspended Solids Density

- Continuous sludge discharge monitor for up to 50% suspended solids
- Rugged 316 stainless steel sensors for in-tank mounting
- Choice of flanged pipeline sensors for in-line density
- Blanket level detection for primary and secondary sludge and industrial slurries
- 4-20mA/HART output using the MSM400 system
- Sludge blanket point level using MCU200 controller and 433 sensors

Rosemount 3490 Universal Controller

- Provides comprehensive configuration and control functionality for Rosemount Ultrasonic Level Transmitters
 - Takes inputs for up to two transmitters and perform differential calculations
 - Also compatible with any 4-20mA or HART compatible transmitters such as Guided Wave Radars (see pages 6-9)
- Easy to navigate menu structure with wizard for assisted start up
- Backlit display gives clear indication of measured values, and status of inputs and outputs
- On-board logging for flow calculations

Rosemount 3101/3102/3105 with aluminum housing



Rosemount 3101/3102/3105 with polymer housing



Rosemount 3107/3108



Rosemount 3490 Controller



“The Rosemount 3100s were easy to install and program, and they provide stable signals.”
– Australian Water Authority

Specification and selection guide¹

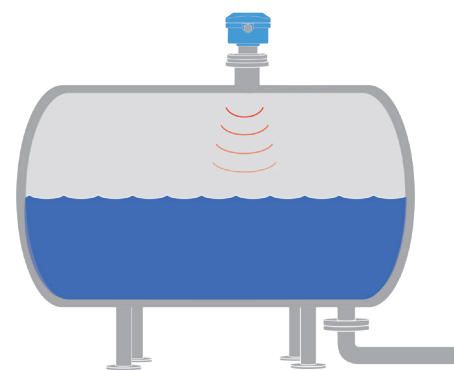
		3101	3102	3105	3107	3108	3490	MCU200/433	MSM400/433	MSM400/448
Application	Level	+	+	+	+	+	+	+	-	-
	Distance, tank volumes, open channel flow	-	+	+	+	+	+	-	-	-
	Sludge interface – point level	-	-	-	-	-	-	+	+	-
	Sludge density – in tank	-	-	-	-	-	-	-	+	-
	Sludge density – tank discharge	-	-	-	-	-	-	-	-	+
Level range	1 to 11 ft (0.3 to 3.3 m)	+	+	+	+	+	+	-	-	-
	1 to 26 ft (0.3 to 8 m)	+	+	+	+	-	+	-	-	-
	1 to 36 ft (0.3 to 11 m)	-	+	+	+	-	+	-	-	-
	1 to 40 ft (0.3 to 12 m)	-	-	-	+	-	+	-	-	-
Certification	Intrinsically safe / hazardous area	-	-	+	+	+	+	-	+	+
Output	Relay 2 x SPST	-	+	-	-	-	+	-	-	-
	Control / Alarm Relay 2 x SPDT	-	-	-	-	-	+	-	+	+
	4-20 mA	+	+	+	+	+	-	-	+	+
	4-20 mA / HART	-	+	+	+	+	-	-	+	+
	WirelessHART with the THUM Adapter	-	+	+	+	+	-	-	+	+
Wetted material	PVDF (plastic)	+	+	+	-	-	-	-	-	-
	UPVC (plastic)	-	-	-	+	+	-	-	-	-
	316 Stainless steel	-	-	-	-	-	+	-	+	+
IP rating	IP66/67 Type 4X	+	+	+	-	-	+	-	-	+
	IP68 Type 6P	-	-	-	+	+	-	+	+	+
Ambient temperature	-4 to 158°F (-20 to 70°C)	+	+	+	-	-	-	-	-	+
	-40 to 122°F (-40 to 50°C)	-	+	+	+	+	+	-	+	+
	-40 to 140°F (-40 to 60°C)	-	+	+	+	+	-	-	-	+
	-40 to 158°F (-40 to 70°C)	-	+	+	-	-	-	-	-	+
Process pressure	-3.6 to 44 psi (-0.25 to 3.0 bar)	+	+	+	+	+	-	-	-	-
	145 psi (10 bar)	-	-	-	-	-	-	+	+	+
	1520 psi (105 bar)	-	-	-	-	-	-	+	+	-
Reference accuracy	± 0.5% of range or ± 0.2 in. (5 mm) ²	+	+	+	+	+	+	-	-	-
	± 0.25% of range or ± 0.1 in. (2.5 mm) ²	-	+	+	+	+	+	-	-	-

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¹ More information in product data sheet (PDS)
² Whichever is the greater
³ Relay 5 x SPST

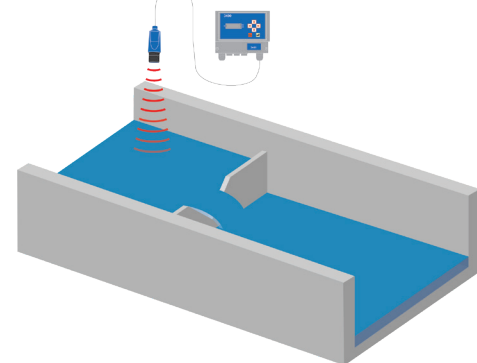
Applications

Tank level monitoring



- The Rosemount 3100 can be used for virtually all atmospheric pressure level measurements
- The Rosemount 3107 is ideal for enclosed wetwells and sumps and is fully encapsulated to withstand accidental submersion
- Coupled with a Rosemount 3490 controller, up to five pumps can be safely controlled – even in hazardous areas

Open Channel Flow



- The Rosemount 3108 is designed for open-channel flow measurement and incorporates a remote temperature sensor to provide fast-response compensation for speed-of-sound correction
- Paired with a Rosemount 3490 controller, the system provides an on-board library of common flow structures

Applications



Liquid and slurry measurement

- The MSM400 can continuously monitor the suspended solids or sludge density contained in or flowing from a clarifier or settlement tank during de-sludging
- Robust stainless steel transducers may be tank mounted or housed in a pipe-section sensor on the clarifier
- The MSM400 provides the automatic control sequence to start a pump or control a valve for sludge or settled product removal

Vibrating Fork Point Level Detection

Manage a wide range of applications with easy installation using Rosemount Liquid Level Detectors. From managing overflow to providing critical alarm functions with smart diagnostics, Emerson takes point measurement to the next level.

Rosemount Vibrating Fork Level Switches

- Virtually unaffected by turbulence, foam, vibration, coating or liquid properties
- Built-in diagnostics continuously monitor electronic and mechanical health
- Adjustable switching delay prevents false switching during turbulence and splashing
- Easy installation, maintenance, and ongoing calibration keep costs down
- DIBt / WHG overflow protection certification provides peace of mind
- Small fork enables tank or pipe mounting
- Visible Heartbeat LED shows device status

Rosemount 2110: compact model for high-volume OEM users

- Stainless steel housing and plug-socket connection for fast-fit, high-volume users

Rosemount 2120: standard model

- Choice of switch outputs, approved for intrinsically safe and Exd hazardous areas
- Flanged, threaded and extended-length options
- IEC 61508 Certified for up to SIL 2 with SIL 3 systematic capability
- A low-power device suitable for battery-powered sites
- 3A and EHEDG approvals for hygienic applications

Rosemount 2130: enhanced performance model

- Extended operating temperature range
- Self-checking fork and sensor diagnostics enhance instrument health
- IEC 61508 Certified for up to SIL 2 in non-redundant configurations
- Remote diagnostics capability

Rosemount 2140: wired HART model

- The world's first wired HART vibrating fork level detector
- Smart diagnostics enable preventative maintenance
- Fully integrated remote proof-testing capability
- IEC 61508 Certified for up to SIL 2 in non-redundant configurations
- Special "sandwich" setting for detecting settled sand and sediment (only available on non-SIL models)

Rosemount 2160: wireless model

- Wireless liquid level detection — add new measurement points in previously inaccessible areas
- Self-checking condition monitoring and alerts available via Field Communicator or AMS
- User-configurable update rate: from one second up to 60 minutes



Rosemount 2110



Rosemount 2120



Rosemount 2130



Rosemount 2140



Rosemount 2160



“I want to be certain that the device switches reliably and safely. Having a 96.6% SFF demonstrates this. Having HART to confirm and report this brings a wealth of additional information, which, in this plant, is critical.”
– Steve Hodges, Engineering Manager, Synthomer (UK) Ltd.

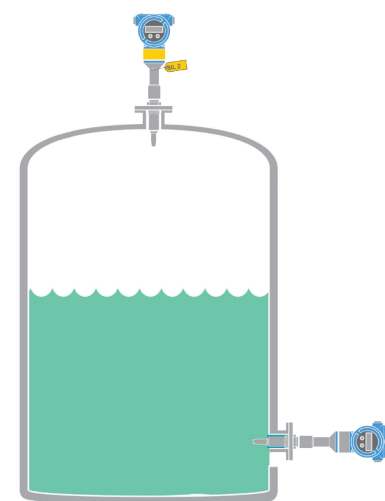
Specification and selection guide¹

		2110	2120	2130	2140	2160
Certification	Explosion proof certification	–	+	+	+	–
	Intrinsically safe	–	+	+	+	+
	Safe area / ordinary location	+	+	+	+	+
	Overflow protection (DIBt/TÜV WHG)	+	+	+	+	+
	Safety system certified to IEC 61508	–	+	+	+	–
	Hygienic	+	+	–	–	–
Output	8/16 mA	–	+	+	+	–
	Direct load switching	+	+	+	–	–
	PNP solid state	+	+	+	–	–
	DPDT ² relay output	–	+	+	–	+ ⁴
	DPDT ² relay output, low power	–	+	–	–	–
	NAMUR	–	+	+	+	–
	WirelessHART	–	+ ³	+ ³	–	+
Wired HART	–	–	–	+	–	
Diagnostics	Basic self-check	+	+	+	+	+
	Advanced health / self-check diagnostics	–	–	+	+	+
	Magnetic test point (local proof-test button)	+	+	+	+	–
	Remote diagnostics	–	–	+ ⁵	+	+
	Smart diagnostics suite	–	–	–	+	–
Housing	Glass filled nylon (plastic)	–	+	–	–	–
	Metal (Aluminum / Stainless steel)	+	+	+	+	+
Wetted material	316L Stainless steel	+	+	+	+	+
	ECTFE copolymer, coated 316L SST	–	+	+	+	+
	Corrosion-resistant nickel alloy C-276	–	+	+	+	+
Process temperature	-40 to 302°F (-40 to 150°C)	+	+	+	+	+
	-94 to 500°F (-70 to 260°C)	–	–	+	+	+
Process pressure	1450 psig at 122°F (100 barg at 50°C)	+	+	+	+	+
Connections	Threaded	+	+	+	+	+
	Tri-clamp	+	+	+	+	+
	Flanged	–	+	+	+	+
Extended lengths available		–	+	+	+	+

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¹ More information in product data sheet (PDS)
² DPDT: Double pole double throw switching
³ When used in conjunction with Rosemount 702 Wireless Discrete Transmitter
⁴ When used with Rosemount 702
⁵ Remote diagnostics available on 8/16 and fault relay outputs

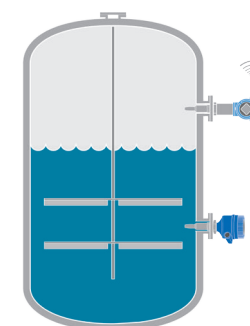
Applications



Reduce maintenance budget and simplify proof-testing

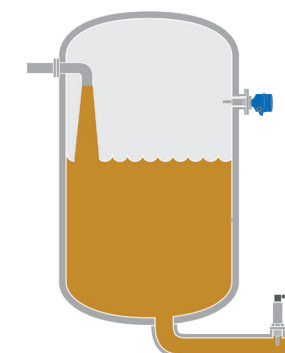
- Regular testing of switches is often necessary, especially in safety-critical applications
- Rosemount 2140 is equipped with a fully integrated remote partial proof-test function requiring no additional wiring or components to be added to the control panel
- Operators can test devices in minutes from the control room with minimal process interruption and no need to climb tanks

Overfill prevention and dry-run protection



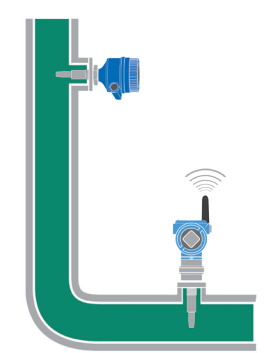
- Implement best practices by using the Rosemount 2100 series to manage maximum and minimum tank levels. Just add an independent switch as a backup in case of primary device failure

Limit detection/pump control



- Use a Rosemount 2100 device to easily detect when maximum liquid level is reached, and deactivate a pump to avoid overfills. Add a second switch to provide pump control over the normal operating range

Run dry/pump protection



- Pump loss due to dry running can be expensive and dangerous — causing ruined product and damage to equipment. Use the Rosemount 2100 series to detect minimum level and avoid pump damage

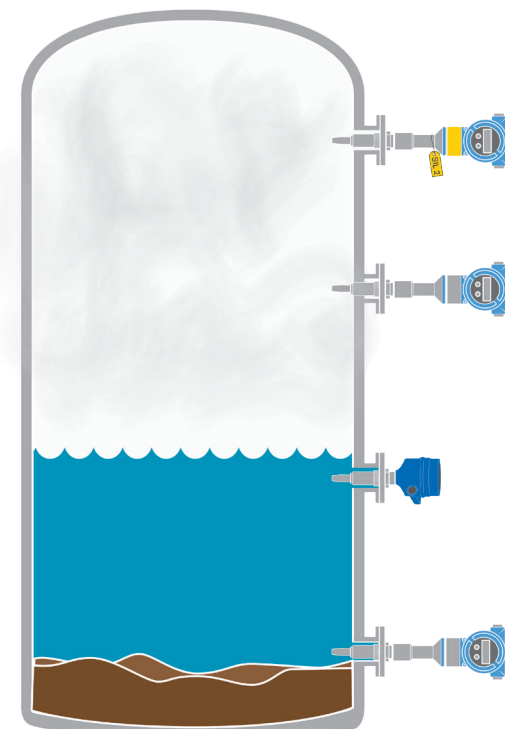
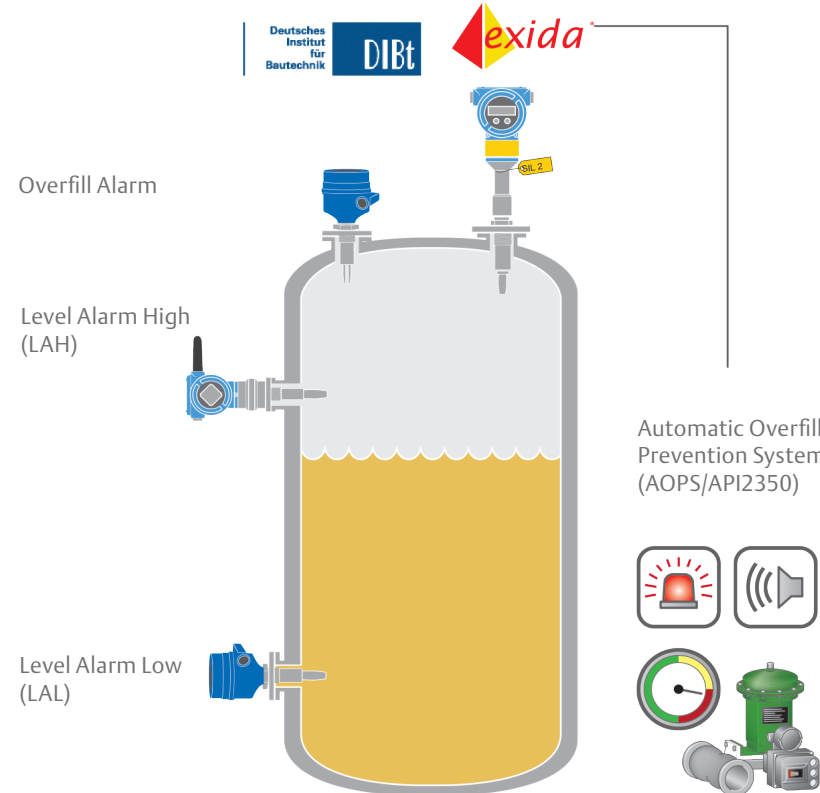
Vibrating Fork Point Level Detection

Cost-effective solutions for maximum control

Between safety regulations that require monitoring of all your tanks and the constant demand to minimize operational costs, you need reliable, cost-effective level switching. Keep your tank level exactly where it should be with high, overfill, and low alarms using Rosemount vibrating fork level switches.

Overfill Approved DIBt / WHG
Rosemount 2110, 2120, 2130, 2140 and
2160 Wireless Vibrating Fork Switches

Independent Level Alarm High-High (LAHH)
Safety critical certified Rosemount 2140:SIS,
2120 and 2130 Vibrating Fork Switches



Overfill prevention

Overfills can be hazardous to workers and the environment, resulting in lost product, costly injuries and expensive clean-up.

- Fast response and reliable control
- IEC 61508 Certified for up to SIL 2 in non-redundant configurations
- TÜV-testing and approval for overfill protection according to German DIBt / WHG
- Increased personnel safety by eliminating the need for manual inspections
- Adaptability for all categories of API2350: overfill standard for tank farms
- In situ partial proof-testing with magnetic test-point
- Reliable technology with few dangerous undetected failures and no moving parts

Oil, Gas and water separator applications

This illustration shows the Rosemount 2120, 2140 and Rosemount 2160 switches in water-gas or water/oil-gas separators. The tank is typically filled with a water-hydrocarbon mix. The middle two Rosemount 2120 devices control high-low safe level. The top and bottom switches provide safety backup to prevent overfilling or pump run-dry during primary system failures.

Due to their low power requirement, both the Rosemount 2120 and Rosemount 2160 are suitable for low-voltage applications on sites using battery power/solar charging.

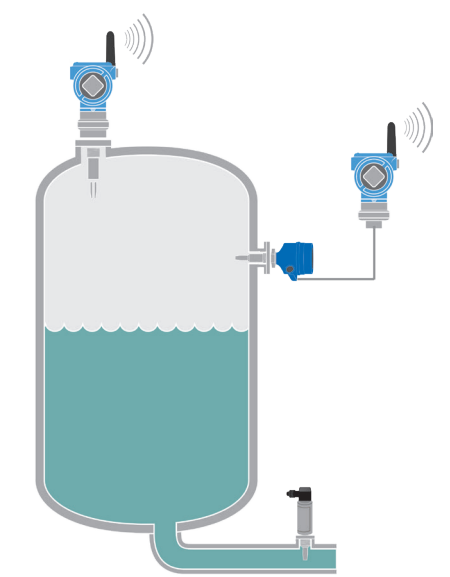
With its special "sand switch" setting, Rosemount 2140 is installed to detect build up of sediment. Operators are alerted before critical level reached, so clean out can be proactively scheduled, avoiding clogging and costly damage.

“Cedar Falls Utilities lowered the risk of damage to capital equipment by using the Rosemount 2120 Switch to ensure their pumps didn't run dry.”



Innovative designs

- “Fast-drip” fork offers quicker response time in viscous fluids
- Adjustable switching delay prevents false switching
- Short fork design minimizes intrusion into vessels and pipes
- Long power module life on wireless model — even with fast update rates
- Easy configuration using AMS or field communicator
- Dedicated fault output for remote diagnostics



Smart diagnostics

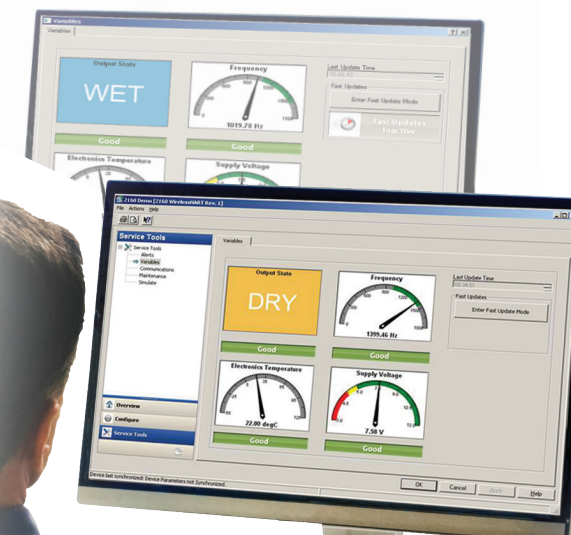
- Offers continuous insight into process and instrument health so you can respond to abnormalities sooner and prevent shutdowns
- Fork corrosion and build-up/coating detection increases reliability
- Process alerts indicate changes based on user-defined configuration
- Remote diagnostics available for Automatic Overfill Prevention Systems

Wireless: increasing accessibility and affordability

The Rosemount 2160 Wireless Vibrating Fork Detector enables new instruments to be quickly and cost effectively installed on remote tanks with no existing cable infrastructure — creating savings of up to 90% on installation costs while enabling data collection at central locations.

Use the Rosemount 2160 for integrated wireless, or Rosemount 2120/2130 with a Rosemount 702 if you need discrete output for local control.

Rosemount 2140 and 2160 Device Dashboards provide single-keystroke access to critical process and device information.



Electromechanical Point Level Detection

You need to trust that your level switches won't let you down. Mobrey float level switches are rugged, robust and trusted globally for their long-term reliability in the harshest of environments and the most hazardous of areas.

Mobrey Float Level Switches

- Tough, rugged design for long life in aggressive environments
- Proven designs which are trusted globally
- High resistance to vibration: false trips eliminated
- Reliable operation at high pressures and temperatures and unaffected by changes in process condition
- Wide range of mounting options and styles to suit all types of application including chamber mount

Mobrey Horizontal float level switches

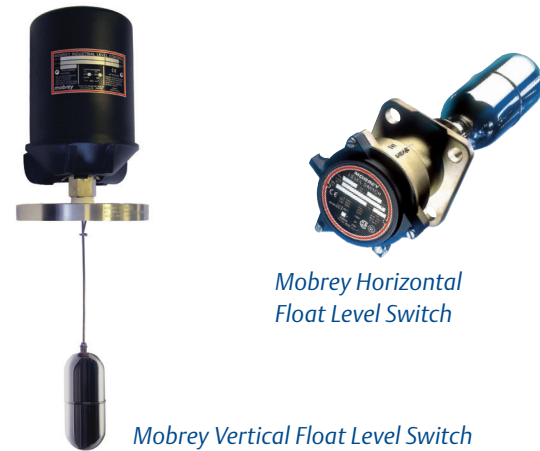
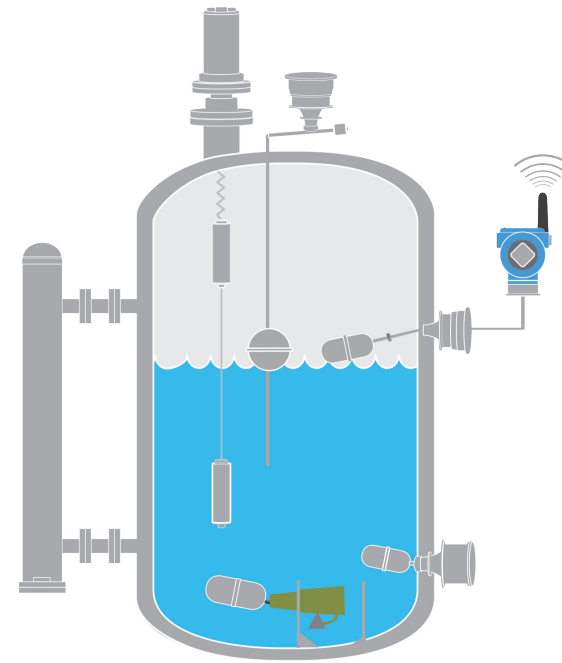
- Widely used in all industries for more than 100 years and certified for marine applications
- Magnetically coupled, unique design with no glands, springs, or linkages
- Snap-acting switching with no hover, bounce; clean make or -break
- Magnetically latched once operated, no reset if level continues to change

Mobrey Horizontal float level switches for critical duties

- Design optimized for use in the power generation industry
- CEEB approved
- Gold contacts for maximum switching reliability
- Tamperproof switch mechanism design

Mobrey Vertical float and displacer level switches

- Unique design with over 50 years' experience: no springs or mercury for reliable environmentally friendly operation
- Multiple switch points possible for flexible switching over a wide level range
- Robust 3-magnet snap-action latching switch mechanism
- Hermetically sealed mechanism eliminates ingress and prevents corrosion



Mobrey Horizontal Float Level Switch

Mobrey Vertical Float Level Switch

“The design is impressively simple, the Mobrey switch is reliable and robust. It can operate at pressures we need and it can take shocks - you can't phase it.”
– Site Engineer, Lindsay Oil Refinery

Specification and selection guide¹

		Horizontal	Vertical
Certification	Explosion proof	+	+
	Intrinsically safe circuit suitability	+	+
	General purpose	+	+
	Marine	+	+
Output/switch type	General purpose	+	+
	Low powered circuits	+	+
	High powered circuits	+	+
	Hermetically sealed	+	+
	Pneumatic	+	-
	WirelessHART	+ ³	+ ³
Housing	Aluminum	+	+
	Aluminum bronze	+	-
	Gunmetal	+	-
	Cast iron	-	+
	Drawn steel	-	+
	Stainless steel	-	+
Wetted parts	Stainless steel	+	+
	Exotic materials	+	+
Process Temperature	Maximum 752°F (400°C) ²	+	+
	Minimum -148°F (-100°C) ²	+	+
Process Pressure	Maximum 1479 psig at 68°F (102 barg at 20°C)	+	+
	Maximum 2900 psig at 68°F (200 barg at 20°C)	+	+ ⁴
Mounting	Threaded, flanged, chamber	+	+

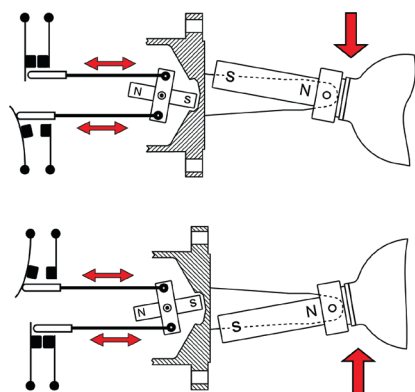
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Ultimate protection in critical power generation applications

- Rugged design - time proven, even in the extreme environment of a power generation plant
- Special CEEB-approved model for critical duties in the power industry
- Prevent dangerous flood or low level condensate conditions in feedwater heaters with robust high/ low level alarms

¹ More information in product data sheet (PDS)
² Dependent on option and material selected – refer to PDS
³ When used in conjunction with Rosemount 702 Wireless Discrete Transmitter
⁴ Special option only

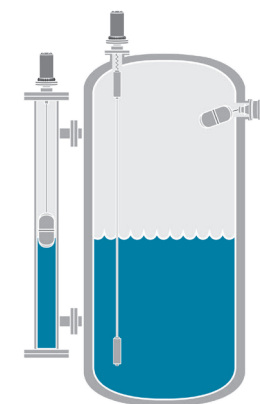
Unique switching mechanism for reduced maintenance



- Magnetically coupled, no glands or linkages, no leaks
- No springs for reduced maintenance
- Snap-acting switch
- No contact hover or bounce, clean make or break
- Latching switch, magnetically latched once operated, no reset if level continues to change
- Solid silver contacts
- No mercury tubes for environmentally friendly switching
- High resistance to vibration, false trips eliminated

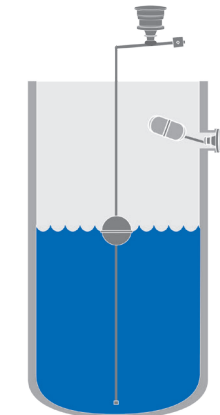
Applications

Reliable high/low level alarm



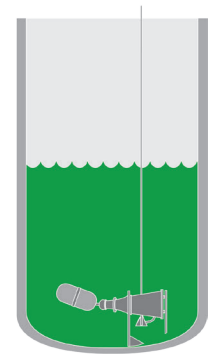
- Prevent dangerous and costly overflows and run-dry

Pump control



- May be specified with pump control mechanism which can be site adjusted to control liquid differential

Submersible applications



- Submersible horizontal model available for when access to outer tank wall is limited

Water and Steam Interface Monitoring

Failure to detect low water levels in steam-raising operations can have costly and potentially disastrous consequences. Use the Hydrastep™ 2468 water and steam monitoring system for highly visible local and remote drum level indication, alarms and trips, with exceptional reliability and options for dual redundancy. Hydrastep, as a Remote Level Indicator, can be used to achieve ASME compliance.

Choose the SIL certified Hydratect™ 2462 for consistently superior detection of water in steam systems to protect against Turbine Water Induction. Hydratect can be used to meet recommendations as specified by ASME TDP-1.

Mobrey Hydrastep Electronic Gauging System

- Reliably and continuously monitor steam drum level, without missing an incident
- Minimize your costs with minimal maintenance
- Gain peace of mind knowing this system is installed and proven in more than 6,000 critical applications globally
- Fault tolerant — no single fault will cause system failure or loss of monitoring
- Trips the boiler when low-water conditions occur
- Will not trip the boiler on a false alarm

Mobrey Hydratect Steam/Water Detection System

- Reliably detect water or steam in lines, columns, and condensate pots
- Certified to IEC 61508 with SIL 3 capability
- Eliminate the need for routine testing through superior reliability and self-checking functionality
- Fault tolerant — no single fault will cause system failure or loss of monitoring

Mobrey Hydrastep and Hydratect electrodes

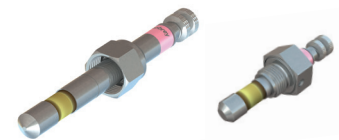
- Highly reliable, comprising ceramics and exotic metals braised together using proprietary processes
- Model variants suitable for up to 560 °C and 300 bar



Mobrey Hydrastep Electronic Gauging System



Mobrey Hydratect Steam/Water Detection System



Mobrey electrodes

“The probability of Hydrastep missing an actual trip is less than 1 in 300 million. The probability of creating a nuisance trip is less than 1 in 10 million.”
– Factory Mutual Research

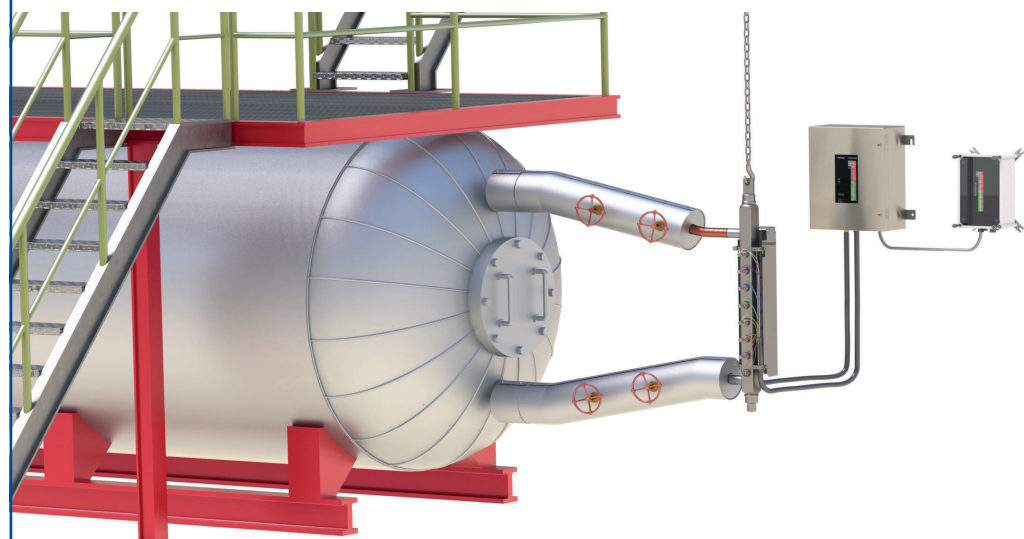
Specification and selection guide¹

		Hydrastep	Hydratect
Application	Steam drum level gauging	+	-
	Water / condensate level detection alarm	-	+
Water column	Carbon steel low pressure to 1740 psi (120 bar)	+	-
	Carbon steel high pressure to 3045 psi (210 bar)	+	-
	Stainless steel supercritical to 4350 psi (300 bar)	+	-
	Carbon steel or stainless steel manifolds (optional)	-	+
Electrodes	Min 8 to max 32 per water column	+	-
	2 per manifold or for local installation	-	+
Control unit	Stainless steel IP65 / Type NEMA4	+	+
	Power supply AC or DC to order	+	+
	Dual redundancy power supply option	+	-
	Electrode output / trip validation	+	+
Output	High visibility local LED indication	+	+
	High visibility remote LED indication	+	-
	4-20 mA	+	-
	Relays	+	+
Approvals	IP65	+	+
	ATEX	+	-
	CSA	+	-
	FM boiler approvals	+	-

KEY: + Available - Not available

¹ More information in product data sheet (PDS)

Hydrastep Applications

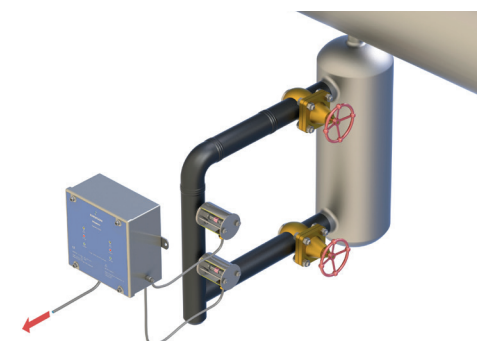


Steam drums and boilers

- Exceptional protection against costly and potentially disastrous low water levels
- The Mobrey Hydrastep water and steam monitoring system provides highly visible local and remote drum level indication and alarms, with exceptional reliability
- Ensure continuous feedwater to boiler feed pump with accurate level monitoring and alarm

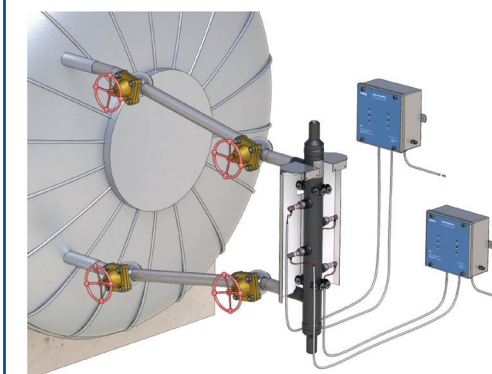
Hydratect Applications

Turbine Water Induction Protection (TWIP)



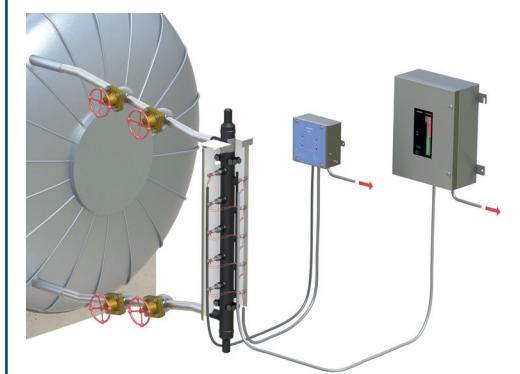
- Ultimate protection for your plant and personnel
- Detect unwanted water in superheated steam lines to trip system and prevent catastrophic turbine failure

Steam drum level trips



- Mobrey Hydratect achieves SIL3 when two status outputs are wired for 1oo2 trip validation, or SIL2 if each channel used independently

Combine Solutions for Level and SIL Certified Trips



- Eliminate false trips with reliable detection of steam / water
- Combine with Mobrey Hydrastep for reliable continuous level measurement with SIL certified trips

Inventory and Custody Transfer Tank Gauging

You're constantly challenged to find new solutions for increasing efficiency, safety and accuracy. Trust the Rosemount Tank Gauging System to help you take content measurement in bulk liquid storage facilities to another level, and meet your productivity goals.

Rosemount Tank Gauging System

- Open and scalable design
- Offers SIL 3 certified safety and unsurpassed accuracy
- Wired and wireless options to fit your needs

Rugged and ready to improve efficiency

The Rosemount Tank Gauging System is a complete, flexible system based on open technology. With its self-configuring devices and 2-wire FOUNDATION Fieldbus communication, it's easy to install the exact devices you need today as well as add or replace units tomorrow.

- Generates reliable, accurate tank content information in real time to help you maximize efficiency
- Allows you to fill tanks higher and better utilize storage capacity

Rosemount 5900S with array antenna



Rosemount 5900S with LPG & LNG antenna



Rosemount 5900S with horn antenna



Rosemount 5900S with parabolic antenna



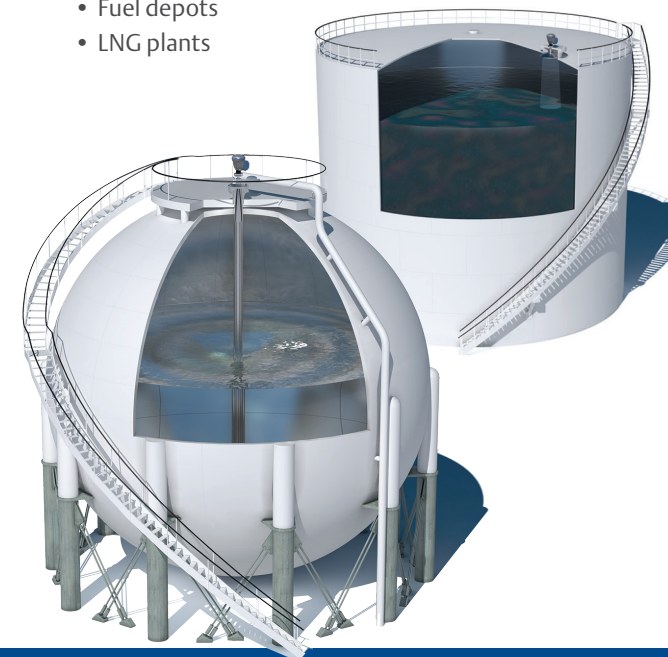
“With reliable automatic tank data available 24 hours a day from the radar-based Rosemount Tank Gauging System, we can substantially increase terminal efficiency.”

– General Manager, Port Klang Terminal, Malaysia

System solutions for various applications and tanks

Rosemount 5900 Radar Gauges fit a wide variety of storage applications and tanks: pressurized and non-pressurized, with fixed or floating roofs, with or without still-pipes. Use it for liquids ranging from asphalt and crude oil to gasoline and liquefied gas.

- Refineries
- Tank terminals
- Fuel depots
- LNG plants

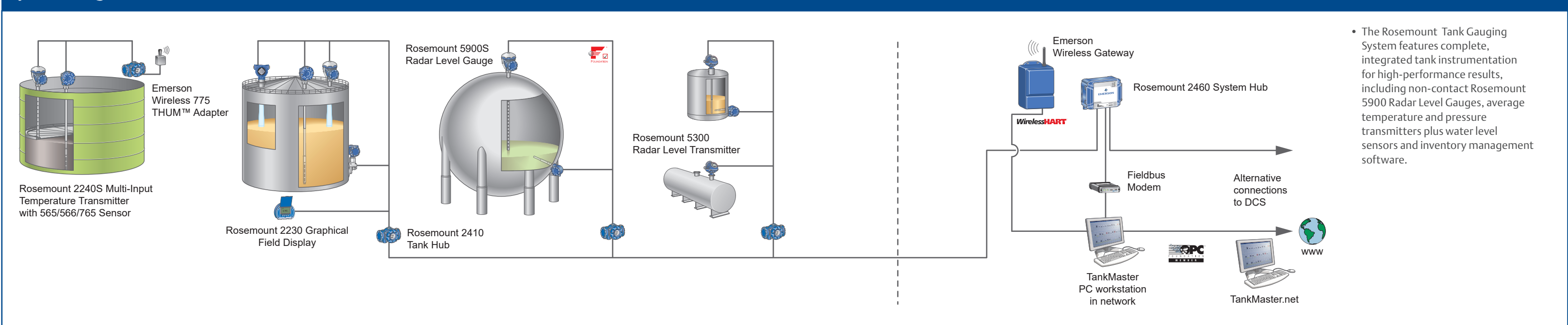


Complete tank inventory management

Increase your tank farm insight by getting critical snapshot overviews of tank data, inventory and custody transfer, configuration, service and setup functions for Rosemount TankMaster. It's a powerful yet easy-to-use Windows™-based inventory management software.

- Make better and more timely decisions
- Base all net volume calculations on current API and ISO standards
- Communicate with DCS/host, Microsoft® programs and OPC compatible systems such as Intellution iFix® and Wonderware® InTouch
- Receive full, global technical support from Emerson

System Design



- The Rosemount Tank Gauging System features complete, integrated tank instrumentation for high-performance results, including non-contact Rosemount 5900 Radar Level Gauges, average temperature and pressure transmitters plus water level sensors and inventory management software.

Inventory and Custody Transfer Tank Gauging

Higher accuracy pays off

Count on Rosemount solutions to deliver unsurpassed accuracy for custody transfer, inventory management and loss control, helping you to optimize your operation and bottom line.

- Level measurement accuracy of 0.02 in (±0.5 mm).
- Accuracy approved for custody transfer by OIML, LNE, PTB and other national institutes
- Very stable average temperature measurements with up to 16 spot elements, ensuring exact net volume calculations
- Gauging solutions from operational control only to custody transfer performance — with full inventory management functionality

Emulation makes upgrades easy

Through proprietary emulation technology, Rosemount Tank Gauging devices can be cost effectively added to an existing system using the previous vendor's fieldbus communication.

- No need for rewiring or trenching — you can upgrade bit by bit, without being stuck with your previous supplier
- Easy control room updates — change your existing tank management software to Rosemount TankMaster for seamless connectivity and trouble-free communication with existing control room devices
- Cost savings — when modernizing existing installations, you'll save on spare parts and maintenance while increasing precision and efficiency



“As our terminal is located in the New York metropolitan area, the Rosemount Tank Gauging System's reliability and overfill prevention capability are fundamental.”
 – Craig Royston, General Manager, New York Terminals



Designed for ultimate reliability

With no moving parts, radar technology is fundamentally reliable. But the Rosemount Tank Gauging System takes safety one step further by including a wide range of overfill prevention options — such as the Rosemount 5900S gauge with a 2-in-1 feature delivered to meet SIL 2 or SIL 3 requirements depending on configuration.



Still not optimized for overfill protection?

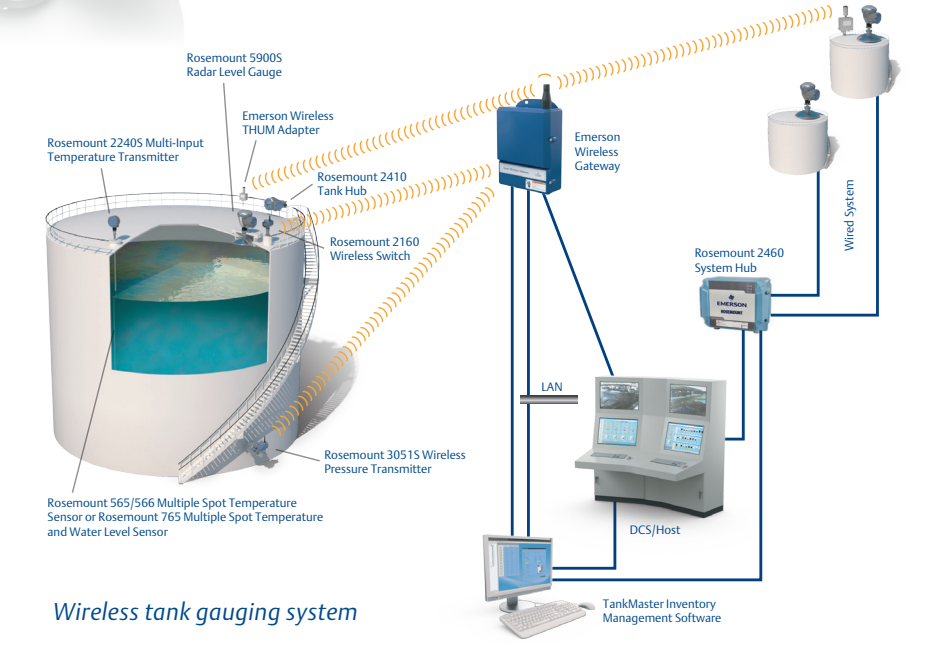
Visit our overfill prevention web page located at Emerson.com/OverfillPrevention, for the knowledge that will help you to achieve modern, compliant tank overfill safety.

Wireless tank gauging

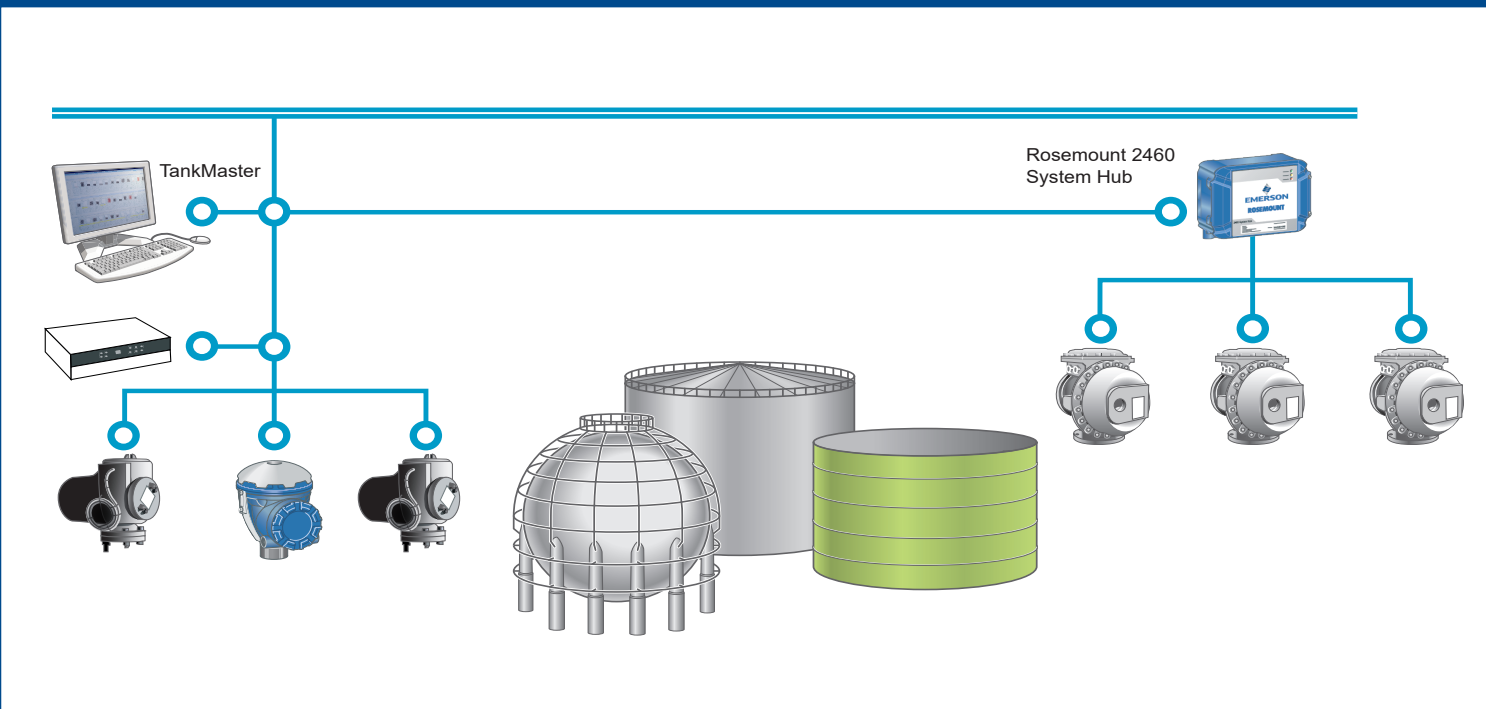
A Smart Wireless tank gauging solution designed specifically for your bulk liquid storage plant maximizes safety and delivers best-in-class performance.

- Lower installation costs
- Very high measurement precision
- Accurate inventory, better tank utilization, and reliable overfill prevention




Wireless technology allows you to send encrypted, secure information to the control room, generating the data accuracy and redundancy you need to reach your targets. And with expandable hardware and software systems to accommodate ongoing infrastructure changes, you'll maximize efficiency for today and tomorrow.



Seamless control room connectivity



A wide range of overfill prevention options

 <p>Rosemount 5900S + 5900S</p> <ul style="list-style-type: none"> • Two independent radar gauges for level and overfill prevention. • IEC 61508 certified overfill prevention up to SIL 3 in non-redundant configuration 	 <p>Rosemount 5900S (2-in-1)</p> <ul style="list-style-type: none"> • Single enclosure with independent level and overfill prevention measurements • IEC 61508 Certified overfill prevention up to SIL 3 	 <p>Rosemount 5900S + 5408/5300</p> <ul style="list-style-type: none"> • Radar level gauge and independent radar level transmitter for level and overfill prevention. • IEC 61508 certified options for overfill prevention up to SIL 2 	 <p>Rosemount 5900S + Switch</p> <ul style="list-style-type: none"> • Radar level gauge and independent vibrating fork or float level switch for level and overfill prevention. • IEC 61508 certified options for overfill prevention up to SIL 2
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Safety and Overfill Prevention

Overfills should always be avoided – but it’s especially crucial if you’re handling liquids that are hazardous and potentially harmful to people, assets, and the environment.

Rosemount sensors for hi-hi level alarm and overfill prevention minimize the risk of overfills, even in the most challenging process and tank gauging applications and, with a full portfolio of IEC 61508 certified products, we can make your process safer.

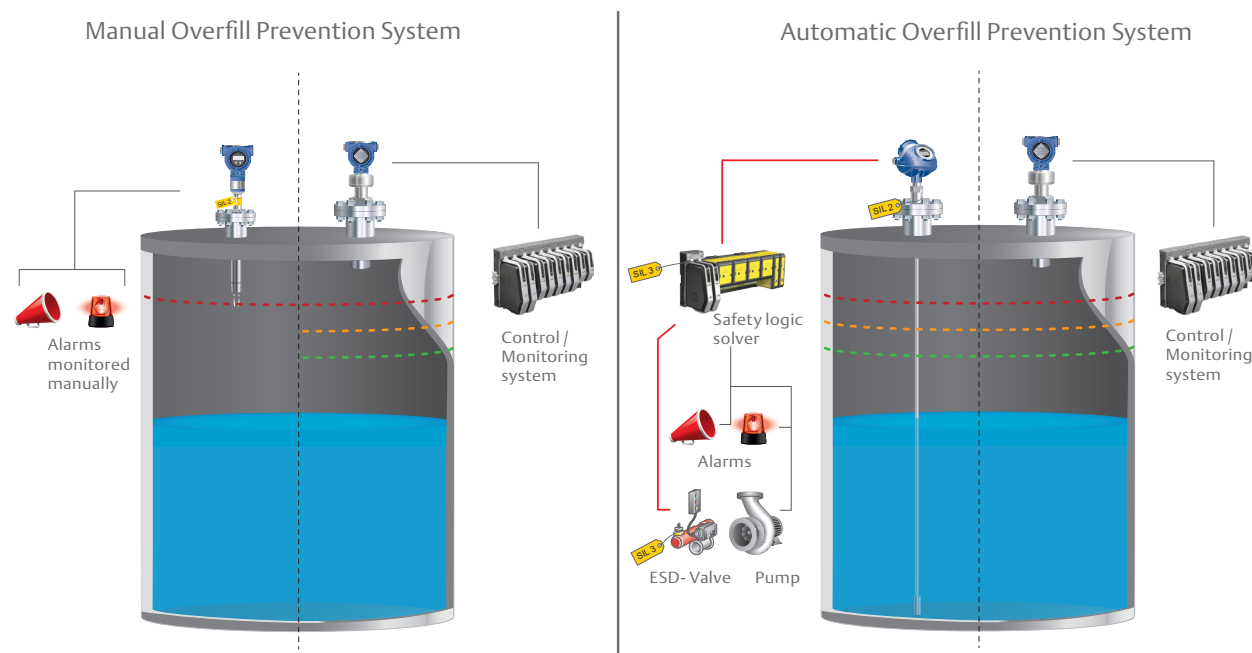
“ Install an independent automatic overfill prevention system conforming to IEC 61511 on all bulk liquid storage tanks” –
 - Recommendation by the Buncefield Major Incident Investigation Board



Stay compliant and in control

Stringent legislation on overfill prevention now requires you to do more. Becoming compliant typically requires you to have one or several independent overfill prevention level sensors. Rosemount Level Sensors are the most reliable while at the same time offering you efficient proof-testing and full compliance with the IEC 61511 safety life-cycle. Future-proof your investment by always purchasing level sensors compliant with IEC 61508.

Process Tanks



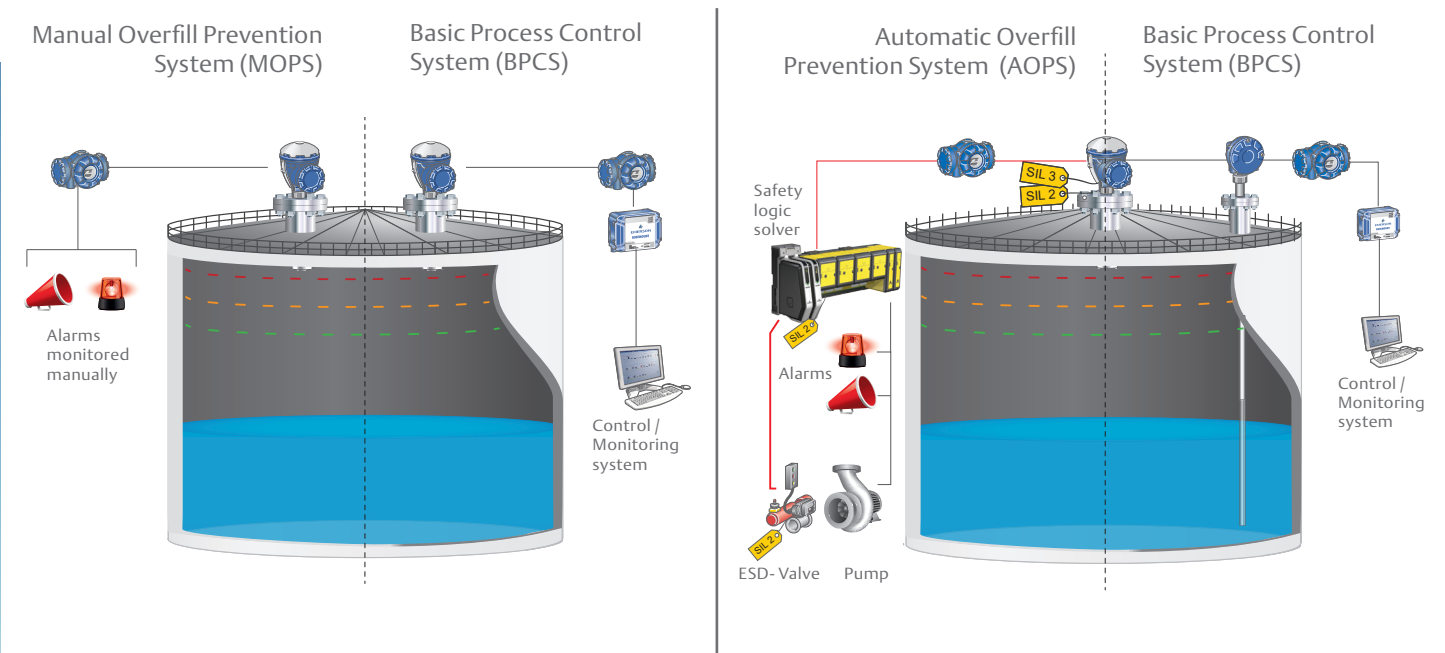
KEY

	IEC61508 Certified		Max work level		Hi level		Hi Hi level
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Level sensors for process industry overfill prevention

Technology	Products	Manual Overfill Prevention System	Automatic Overfill Prevention System
Non-Contacting Radar	Rosemount 5408:SIS	+	+
Guided Wave Radar	Rosemount 5300	+	+
Vibrating Fork Switches	Rosemount 2120/2130/2140:SIS	+	+
Wireless	Rosemount 2160 Vibrating Fork Switch Rosemount 3308 Guided Wave Radar	+	-

Bulk Liquid Storage Tanks



KEY

	IEC61508 Certified		Max work level		Hi level		Hi Hi level
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Level sensors for bulk liquid storage overfill prevention

Technology	Products	Manual Overfill Prevention System	Automatic Overfill Prevention System
Non-Contacting Radar	Rosemount 5900 Rosemount 5408:SIS	+	+
Guided Wave Radar	Rosemount 5300	+	+
Vibrating Fork Switches	Rosemount 2140:SIS	+	+
Wireless	Rosemount 2160 Vibrating Fork Switch Rosemount 3308 Guided Wave Radar Rosemount 5900 Non-Contacting Radar, and Wireless THUM Adapter	+	-



Level Instrumentation for Hygienic Applications

Downtime and rising production costs threaten your operations in today's fiercely competitive marketplace. When tasked with optimizing your plant's production, the smallest oversight can result in excessive downtime and lowered profitability.

Installing Rosemount hygienically certified level instrumentation keeps your processes under control, maximizing production capacity and efficiency, and ensuring stringent safety standards are met.

Rosemount 2110 Vibrating fork liquid level switch

- 3-A, EHEDG certificates. Materials compliant to FDA and ASME-BPE
- Compact all stainless-steel design
- Heartbeat LED gives clear visible indication of process status
- Magnetic test point for quick and easy functional test



Rosemount 2110

Rosemount 2120 Vibrating fork liquid level switch

- Choice of switch outputs, approved for intrinsically safe and Exd hazardous areas
- 3-A, EHEDG certificates. Materials compliant to FDA and ASME-BPE
- Robust design, with excellent resistance to humidity and corrosive environments
- Selectable switch delay prevents false trips in turbulent applications
- Magnetic test point for quick and easy functional test



Rosemount 2120

Rosemount 326L Hygienic Level Transmitter

- Designed and optimized for food and beverage applications
- Full suite of hygienic certificates
- Compact form factor, allowing for mounting in tight spaces and small vessels
- Simple installation and setup enables you to get your process online quickly
- Modular hygienic process connections provide flexibility for tank and pipe connections
- 4-20mA output and IO-Link deliver ease of integration in to existing or new systems



Rosemount 326L

Rosemount 5408 Non-Contacting Radar Level Transmitter

- 3-A certificate for tri-clamp process seal connection
- Material compliant to FDA
- 2mm accuracy
- FMCW technology provides a robust and reliable measurement



Rosemount 5408

Rosemount 1199 Hygienic Diaphragm Seals

- Complete hygienic diaphragm seal offering including Tri-Clamp, Tank Spud, Inline connection types
- Wetted Materials compliant to 3-A, EHEDG, USP, and FDA
- FDA grade fill fluids
- Improved surface finish & electropolish options
- Available with all Rosemount pressure transmitters including 3051S Electronic Remote Sensor (ERS) Systems



Rosemount 3051SAL with hygienic seals

“ The top challenge identified by food and beverage respondents when trying to increase their production efficiency is the need to improve repeatability and decrease variations in the production process”
 – Achieving Operational Excellence in Food & Beverage. Aberdeen Group.



Food and Beverage Processing

Incorrect level measurements, run-dry situations, overfills, and spills reduce efficiency and may result in stopped production, lost product and costly clean up, with severe consequences. Maximize your capacity and reduce production costs while meeting stringent quality and food safety standards by installing Rosemount point and continuous level instrumentation on tanks and vessels.

Life Sciences and Pharmaceuticals Manufacturing

Inconsistent, unreliable level measurement can reduce batch to batch consistency, resulting in spoiled product, increased cycle times, and increased production costs. Trust your level measurement in high-precision applications with reliable, accurate, and easy to use level instrumentation.

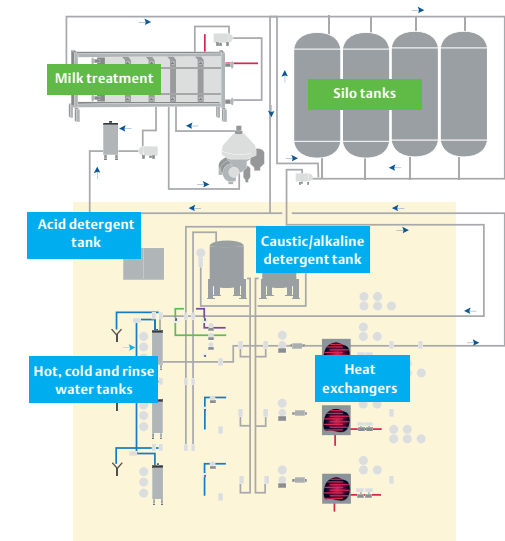
Specification and selection guide¹

		2110	2120	5408	326L	DP Level
Available measurement	Point level	+	+	-	-	-
	Continuous level	-	-	+	+	+
	Hydrostatic level	-	-	-	-	+
Hygienic certificates	3-A	+	+	+	+	+
	EHEDG	+	+	-	+	+
Outputs/Protocol	4-20mA	-	-	+	+	+
	FOUNDATION Fieldbus	-	-	-	-	+
	IO-Link	-	-	-	+	-
	HART	-	-	+	-	+
	Relay	-	+	-	+	-
	PNP/PLC	+	+	-	+	-
	Direct load	+	+	-	-	-
	8/16mA	-	+	-	-	-
Housing materials	Plastic (Nylon)	-	+	-	-	-
	Aluminium	-	+	+	-	+
	Stainless steel	+	+	-	+	+
Wetted materials	Stainless steel	+*	+*	-	+	+
	Food grade PTFE	-	-	+	-	-

KEY: + Available - Not available
 * Machined, electropolished, mechanical polish

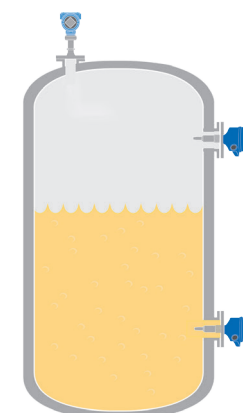
Optimize your CIP Operations

- Achieve reliable high and low level control for effective automation of water, detergent, and chemical tanks with the Rosemount 2100 series. Selectable switch delay prevents false high/ low level tank trips from spray balls
- Hot CIP processes create vapors that high frequency radars have difficulty penetrating. Get accurate continuous level measurement in steamy CIP tanks with FMCW technology that can handle changes in vapor space



Principle of a centralized CIP system

Storage and buffer tanks



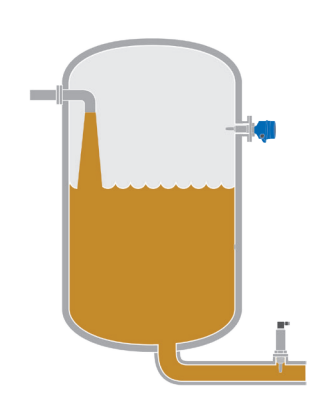
- Automate filling and emptying cycles and prevent overfills and spills with accurate, reliable level instrumentation that is easy to install, configure, and operate

Mixers and blending tanks



- Ensure batch to batch consistency with high accuracy instruments. Typical process condition such as turbulence is not a challenge due to the sensitivity of the instruments

Pump protection



- Prevent run-dry situations, costly equipment damage, and production shutdown even where space is limited with compact, low intrusion level detection

Solids Level Measurement

Take the guesswork out of measuring solids with reliable, accurate level and volume measurement and manage bulk solids inventory with the Rosemount portfolio of solids transmitters and acoustic scanners.

Rosemount Solids Measurement

When you need to improve operational efficiency, avoid overspills, and optimize delivery scheduling, accurate material measurement and control of inventory is vital.

- Get highly accurate level and volume measurement
- Improve production tracking
- Obtain insight into what is really going on inside your silo
- Increase safety and reduce risks

Rosemount 5303 Guided Wave Radar

- Handle media with low dielectric constants
- Ideal solution for smaller silos with rapid level changes
- Achieve robust measurement despite presence of internal obstacles
- Integrate easily with two-wire communication

Rosemount 5408 Non-Contacting Radar

- Ideal solution for smaller silos with rapid level changes
- Avoid internal obstructions yet still keep good level measurement
- Integrate easily with two-wire communication

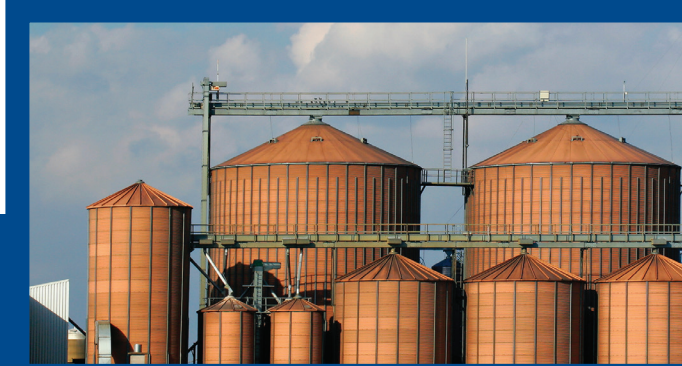
Rosemount 5708 3D Solids Scanner

- Get highly accurate readings of level and volume
- Make informed decisions about inventory control
- 3D visualization feature provides accurate material allocation
- Optimal solution for large vessels and warehouses
- Reduce maintenance with self-cleaning antennas



Rosemount 5708

“The 3D Solids Scanner solves all our operational problems. No other equipment in the past gave us such reliable volume measurement.”
– DGM, C&I Aditya Cement



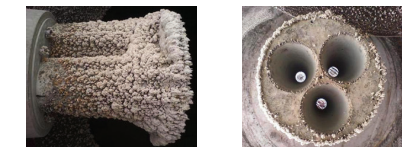
Specification and selection guide¹

		5303	5408	Series 5708L	Series 5708V	Series 5708S
Measurement	Guided wave continuous level measurement	+	-	-	-	-
	Non-contact continuous level measurement	-	+	+	+	+
	Measurement principle - Low frequency acoustic wave	-	-	+	+	+
	Unaffected by dust generation	+	+	+	+	+
	Single point measurement	+	+	-	-	-
	Multiple point level measurement	-	-	+	+	+
	True volume measurement	-	-	-	+	+
	3D Surface visualization	-	-	-	-	+
	Beam angle	NA	4.5-18 [*]	25-90 [*]	25-90 [*]	25-90 [*]
Output	4-20 mA	+	+	+	+	+
	4-20 mA with HART	+	+	-	-	-
	MODBUS	-	-	- ^{**}	- ^{**}	- ^{**}
	RS-485	-	-	+	+	+
	FOUNDATION Fieldbus	-	-	-	-	-
	WirelessHART with THUM adapter	+	+	+ ²	+ ²	+ ²
	Performance	Maximum measuring range	164ft/50m	131ft/40m	229ft/70m	229ft/70m
Reference accuracy	±0.1in/3mm	0.08in/2mm	±0.6in/15mm	±0.6in/15mm	±0.6in/15mm	
Features	Continuous self-cleaning	-	-	+	+	+
	Air-purging	-	+	-	-	-
	Probe End Projection	+	-	-	-	-
	3D Visualization	-	-	-	-	+
Process temperature	-40 to 302°F (-40 to 150°C)	+	+	-	-	-
	-40 to 356°F (-40 to 180°C) (No hazardous location certification available)	-	-	+	+	+
	-40 to +185°F (-40 to +85°C)	-	-	+	+	+
	-76 to 482°F (-60 to 250°C)	-	+	-	-	-

KEY: + Available - Not available
* Dependent on antenna choice
** Modbus is available for for viewing information

Maintenance free

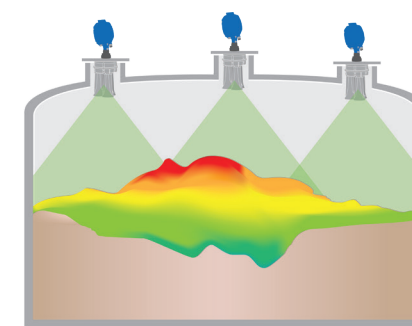
- The Rosemount 5708 needs very little maintenance. It has no moving parts to stick and requires no re-calibration
- Self-cleaning capabilities prevent material from accumulating on the antennas, ensuring reliable performance in harsh, dusty conditions.



Outer unit is coated with build-up from dust
Inside the unit is clean and fully operational

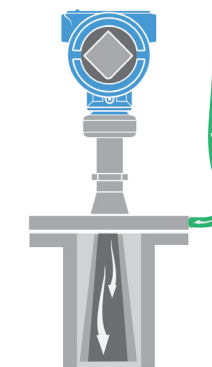
¹ More information in product data sheet (PDS)
² Output only available, no configuration

Visualization to control content



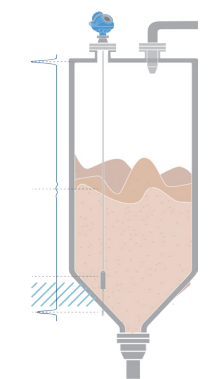
- With 3D Vision software, the Rosemount 5708 can generate a visualization of the measured content. This helps to detect material allocation to enable predictive maintenance, improve vessel usage, and increase safety

How to manage dust



- Dusty environments do not pose a problem. Rosemount 5408 manages dusty environments by using air purging, and the Rosemount 5708 uses low frequency acoustic waves to penetrate common dusty environments with minimal signal loss

Low dielectrics and long measuring ranges



- Probe End Projection is a function in the Rosemount 5303 that allows measurements to be made when the surface pulse is too weak to be detected

Wireless Level Instrumentation

Adding wired measurement points isn't always feasible, especially in remote locations. Rosemount Wireless instrumentation offers a scalable wireless solution for every measurement. The wireless network can continue to run, even while new devices are being added and old ones are removed. You can change or expand your field, measurements, and means of operation simply and quickly.

Rosemount Wireless Vibrating Fork Switches

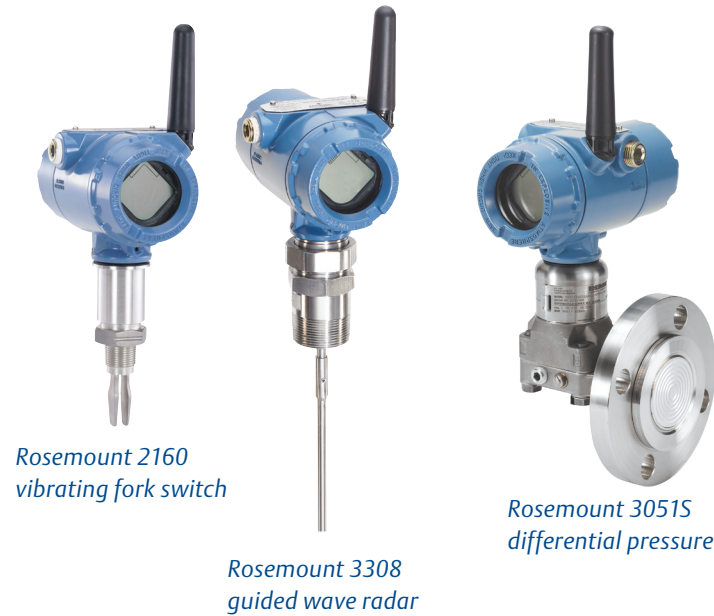
- World's first true wireless vibrating fork liquid level switch
- Self-checking condition monitoring and alerts
- Suitable for both monitoring and control applications

Rosemount Wireless Guided Wave Radar

- World's first true wireless guided wave radar
- Easy top-down installation and robust performance
- Advanced diagnostics for predictive maintenance

Rosemount Wireless Differential Pressure Level

- Complete offering to meet expanding application needs
- Proven technology that has become an industry standard
- True wireless Pressure, DP flow, and DP level measurements



“With 2160 installed, an operator does not have to stand by the tank during tank filling to monitor tank overflow, increasing efficiency of manpower.”
 – T.M. Wong, Operation Manager, Lubrizol Southeast Asia



Reducing cost and complexity

Start your Wireless experience on a small scale, and easily expand later. The unified Emerson Wireless architecture uses multiple field networks to connect up to thousands of devices. Measurements can be added in minutes or moved without the engineering, documentation, and installation challenges required for wiring for power and communications.

Wireless field instruments send data to a gateway, directly or routed through wireless devices in the network. Multiple communication paths are managed and analyzed in parallel to ensure optimal communication and sustained network reliability, even if obstructions are introduced — for actionable data you can count on.

Specification and selection guide¹

	Rosemount 2160 Vibrating Fork	Rosemount 3308 Guided Wave Radar	Rosemount 3051S DP Level
Output	WirelessHART IEC 62591	WirelessHART IEC 62591	WirelessHART IEC 62591
Measurement	Point level	Continuous level and/or interface	Continuous level
Communication update rate	User-configurable 1 sec ... 60 min	User-configurable 4 sec ... 60 min	User-configurable 1 sec ... 60 min
Power module life (1 minute update rate)	10 years	9 years	10 years

¹ More information in product data sheet (PDS)

Accessories

Emerson Wireless Gateway



- Connects WirelessHART networks with host systems and data applications
- Automatic management of communication paths for optimal data reliability and simple scalability

Emerson Wireless 775 THUM™ Adapter



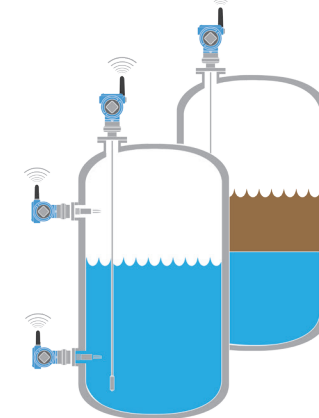
- An installation-ready solution providing rich WirelessHART data
- Fits any 2- or 4-wire HART devices, with no battery required
- Unlocks access to stranded HART information

Rosemount 702 Wireless Discrete Transmitter



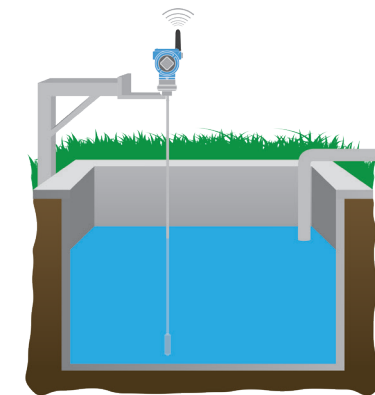
- An installation-ready device that provides dual discrete or leak detection input options
- Long power module life minimizes maintenance and replacement costs

Storage, buffer or waste tanks



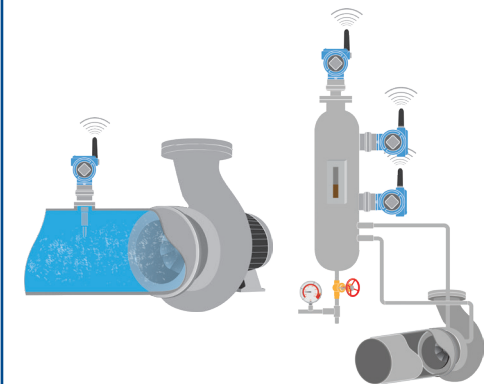
- Reduce installation time from days to hours and keep up with rapid plant expansion using Rosemount wireless level devices

Remote and open air applications



- Configure, monitor, and control level from the control room and gain advanced process and device health diagnostics with proactive alerts

Pump and seal control and protection



- Protect valuable plant equipment without the need to visit the pump with Rosemount wireless level devices that monitor seal fluids and help prevent pumps from running dry

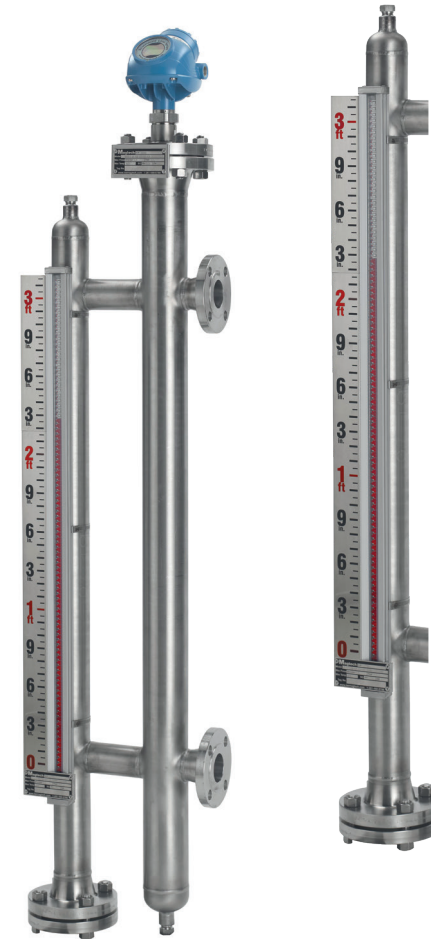
Complete Point Solutions™

Reliable, low maintenance, redundant measurements are vital to the efficiency of your operation, so you need time tested solutions. Emerson's Rosemount magnetic level indicators have served the process industry for over 30 years with flexible and creative solutions for a wide variety of applications, and provide a low maintenance alternative to sight glasses.

Test, inspection and certification are increasingly important, and managing complex requirements reliably in today's safety conscious environment is a strength of Rosemount Magnetic Level Indicators.

Rosemount Magnetic Level Indicators

- Easy to install, built to suit existing applications
- Clear visual level indication to 100 ft (30 m)
- No process liquid in contact with indicator glass
- Ideal for high-temperature, high-pressure, and corrosive applications
- Manufactured to meet ASME B31.1 or ASME B31.3
- Paired with a guided wave radar in a chamber, Rosemount Magnetic Level Indicators offer a low maintenance solution for both high accuracy and local indication
- Custom engineered to meet the most stringent customer requirements



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



Gain additional capabilities with Rosemount accessory products and get even more from your level measurement devices.

The Rosemount 9901 Series is a range of high quality chambers to allow external mounting of instrumentation on process vessels. The Rosemount 3490 Series provides comprehensive instrument control functionality for any 4-20 mA or HART compatible transmitter.

Rosemount 3490 Universal HART controllers

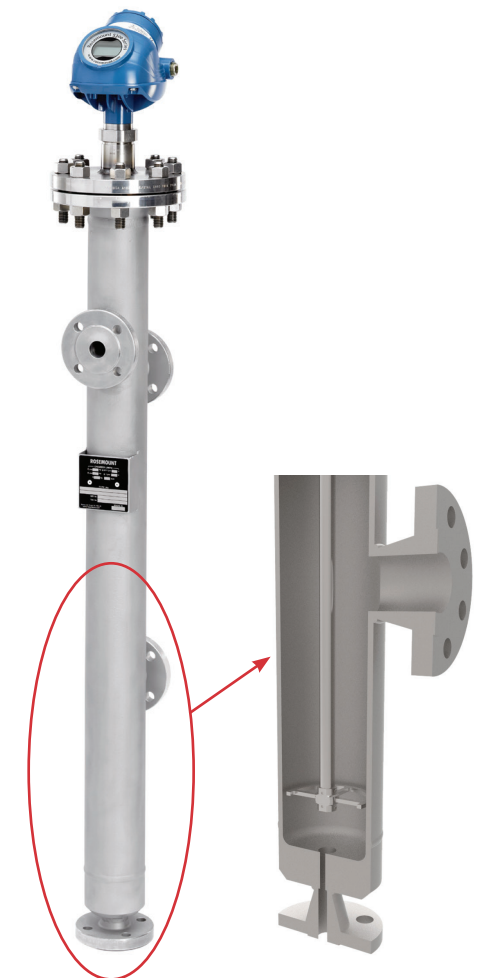
- Provides comprehensive control functionality for any 4-20 mA or HART compatible transmitter
- Intrinsically safe 24V dc power supply to the transmitter
- 5 x SPDT relays, configurable for alarm or control duty
- 3-line LCD display, fully configurable to display engineering units



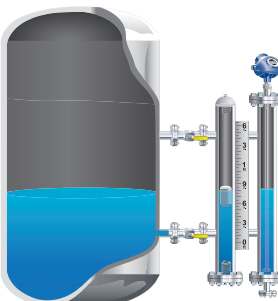
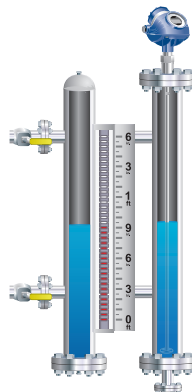

Rosemount 3490 Controller

Rosemount 9901 Chambers

- Replace displacers with Rosemount complete solution guided wave radar
- Easy isolation of the instrument for routine maintenance
- Ensure transmitter - chamber fit
- One-stop shopping saves man-hours and reduces risks
- Standardized or custom design to fit existing vessels
- Useful for in-tank restrictions like turbulent vessel conditions or in-tank constraints
- Designed to ASME B31.3
- Pressure Equipment Directive (PED) compliant
- Integrated bolt-on instrument solution



Rosemount 9901 external chamber with Rosemount 5300 Guided Wave Radar

Applications		
<p>Redundant solution</p>  <ul style="list-style-type: none"> • Custom engineered for use with Rosemount guided wave radar transmitters • Redundant system for use in a wide range of applications • Perfect complete point solution – no project delays 	<p>Safety systems</p>  <ul style="list-style-type: none"> • Independent certified testing • Process connection design suitable for 100% Radiography • Designed for safety systems requiring redundancy 	<p>Custom made for the application</p>  <ul style="list-style-type: none"> • Custom designed to match the customer's process connections, and applications • Application based solution • High alloy construction available



Your guide to level product selection

With so many technologies, products, and parameters to consider, selecting the best technology for level measurement can be challenging. Use this guide to help choose the best solution for your level application, and see more technology details on the relevant product pages.

Operational features

Key features	Guided wave radar	Non-contacting radar	DP / Hydrostatic	Ultrasonic	Acoustic 3D solids scanner	Vibrating fork switch	Magnetic float switch
HART® output	+	+	+	+	-	+	-
FOUNDATION™ fieldbus	+	+	+	-	-	-	-
MODBUS®	+	+	+	-	+	-	-
WirelessHART®	+	With THUM Adapter	+	With THUM Adapter	With THUM Adapter	+	With 702 wireless discrete transmitter
Profibus®	-	-	+	-	-	-	-
Relays	-	-	-	2	-	2	-
Fault monitoring self-checking	+	+	+	+	-	+	-
Configurable display	+	+	+	+	-	+	-
Temperature inputs	-	6	1	1	-	-	-
Primary multivariable options	Level Volume Interface	Level Volume Temperature	Differential Pressure Temperature	Level Volume Open channel flow	-	Level	Level
Measurement frequency	<1 GHz	6–26 GHz	N/A	51–57 kHz	2.3, 4.5 & 7 kHz	1200-1500 Hz	N/A
Reference accuracy	± 3 mm	± 3 mm	Varies by product	± 0.25% of measured range	15 mm	Hysteresis (water) ± 1 mm	± 13 mm
Process pressure min and max limits	Full vacuum to 5000 psi (345 bar)	Full vacuum to 798 psi (55 bar)	Full vacuum to 15000 psi (1034 bar)	-3.6 to 44 psi (-0.25 to 3 bar)	-0.29 to 43.5 psi (-0.02 bar to 3bar)	Full vacuum to 1450 psi (100 bar)	Full vacuum to 2900 psi (200 bar)
Process temperature min and max limits	-320 to 752°F (-196 to 400°C)	-40 to 752°F (-40 to 400°C)	-103 to 770°F (-75 to 410°C)	-22 to 158°F (-30 to 70°C)	-40 to 185°F / 356°F (-40°C to 85°C / 180°C)	-94 to 500°F (-70 to 260°C)	-72 to 752°F (-60 to 400°C)
Safety systems suitable	YES	YES	YES	NO	NO	YES	NO

KEY: + Available – Not available

Application considerations

		Guided wave radar	Non-contacting radar	DP level / Hydrostatic	Ultrasonic	Acoustic 3D solids scanner	Vibrating fork	Float
		Continuous					Point	
Measurement	Level	●	●	●	●	●	●	●
	Interface (liquid / liquid)	●	●	●	●	●	●	●
	Volume	●	●	●	●	●	●	●
	Density	●	●	●	●	●	●	●
	Mass	●	●	●	●	●	●	●
	Open channel flow	●	●	●	●	●	●	●
Process medium characteristics	Changing density	●	●	●	●	●	●	●
	Changing dielectric ¹	●	●	●	●	●	●	●
	Wide pH variations	●	●	●	●	●	●	●
	Pressure and temperature changes	●	●	●	●	●	●	●
	Condensing vapors	●	●	●	●	●	●	●
	Bubbling/boiling surfaces	●	●	●	●	●	●	●
	Foam	●	●	●	●	●	●	●
	Coating liquids	●	●	●	●	●	●	●
	Viscous liquids	●	●	●	●	●	●	●
	Crystallizing liquids	●	●	●	●	●	●	●
Solids, granules, powders	●	●	●	●	●	●	●	
Sludges and slurries	●	●	●	●	●	●	●	
Tank environment considerations	Top-down connection	●	●	●	●	●	●	●
	Bottom or side connections direct to vessel	●	●	●	●	●	●	●
	Stilling wells or chamber applications	●	●	●	●	●	●	●
	Mounting close to tank wall / disturbing object	●	●	●	●	●	●	●
	High turbulence	●	●	●	●	●	●	●
	Long and narrow mounting nozzles	●	●	●	●	●	●	●
	Angled or slanted surface	●	●	●	●	●	●	●
	High empty and fill rates	●	●	●	●	●	●	●
	Internal obstructions ²	●	●	●	●	●	●	●
	Agitation	●	●	●	●	●	●	●
	Non-metallic vessel	●	●	●	●	●	●	●
Nozzle in center of tank	●	●	●	●	●	●	●	
Compatible where valves or isolation are required	●	●	●	●	●	●	●	
Small tank < 40 in (1 m)	●	●	●	●	●	●	●	

1 Changing dielectric has no impact on level measurements but it will have some impact on interface measurements
 2 Position instrument where it will not have contact with agitator blades

Lifecycle Services

When you invest in Rosemount instrumentation, you expect a higher level of performance. You can count on factory-trained and certified experts for all diagnostics, field service and repair on Rosemount level devices.

With an expanding network of service capabilities across the world, rest assured we are where you need us, when you need us.



With Emerson's pre-paid start up and commissioning service you can stay on schedule and maximize device capabilities. Factory trained, Rosemount certified technicians will commission your devices to OEM specifications - within the time frame of your start-up schedule.

Professional start-up ensures the accuracy and reliability of your process level instrumentation, keeping your operations online and giving your staff more time for higher-priority tasks.

- Ensure the highest quality
 - Validate and certify installation of instrumentation according to your reference standards
- Start-up on schedule
- Improve staff skill set
 - Conduct on-site product training with Emerson service technicians
- Get a three-year warranty
 - Increase your factory warranty to three years with start-up service
- Receive a one-year follow-up

Level devices included in the lifecycle services program

- Rosemount Guided Wave Radar
- Rosemount Non-Contacting Radar
- Rosemount 3D Solids Scanners
- Rosemount Differential Pressure Level Transmitters



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