



Operate at Your Full Potential

Melissa Ruths

Rosemount AP Marketing Director



EMERSON
Process Management

We Provide a Full Portfolio of Measurement and Analytical Products

Instruments



Pressure



Temperature



Level



Flow



Liquid Instruments



Wireless



Nuclear/ High Integrity



Combustion Gas Analyzers



Flame & Gas



Solutions



Tank Gauging



Gas Chromatographs



Process Gas Analyzers



Cascade Quantum Cascade Laser



We Back our Products and Solutions with a Full Suite of Lifecycle Services

Services



Plan & Design

- Project Management
- FEED
- Site Audits & Consulting

Implement & Build

- Startup
- Commissioning

Operate & Maintain

- Contracts
- Calibration
- Repair & Spares

Improve & Modernize

- Turnaround Management
- Wireless Network Health

Train & Develop

- Local Facilities
- On-Site Training

Today's Available Sessions

Operate at Your Full Potential

Applications & New Products for:

- Pressure
- Temperature
- Level
- Wireless

Analyze & Detect it

Applications & New Products for:

- Liquid Instruments
- Flame & Gas
- Gas Chromatographs
- Process Gas Analyzers
- Cascade QCL

Building Smart Terminals of the Future

Emerson's Terminal solution including:

- Tank Gauging
- Flame & Gas
- Pressure
- Temperature
- Wireless

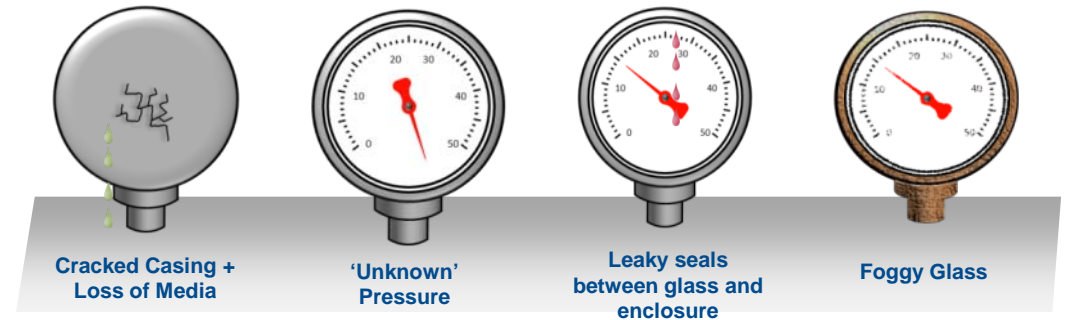
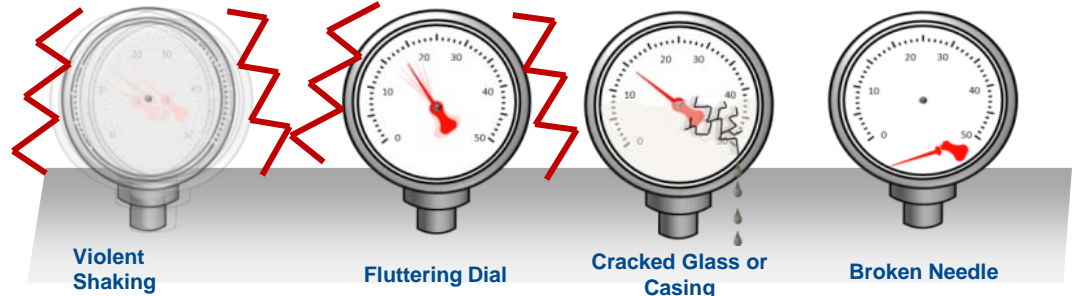
Identifying Problematic Mechanical Pressure Gauges

Leading Causes of Mechanical Gauge Frustrations

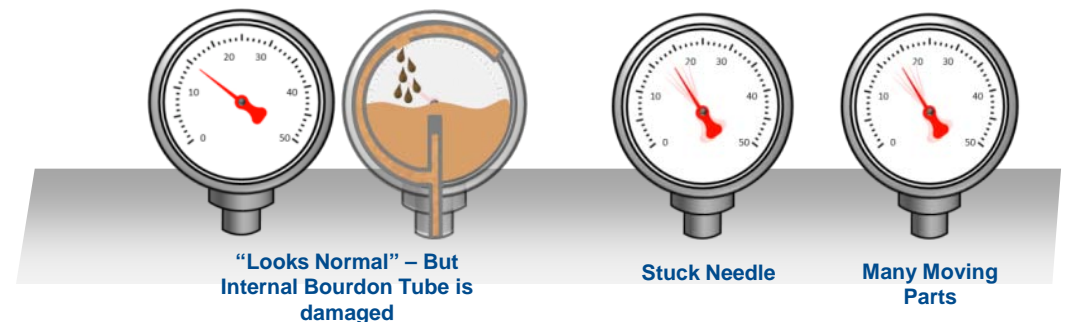
Vibration
Over Pressure
Temperature
Corrosion
Accidental Damage
Pulsation



Visible Symptoms



Invisible Failures



Introducing the New: Rosemount™ Wireless Pressure Gauge

- **Reduce Maintenance Challenges**
 - Get up to 10 years of reliable readings through industry-proven, pressure sensor technology
 - Reduce common mechanical gauge failures caused by vibration, overpressure and other environmental factors
 - Have confidence in pressure gauge health with local indicator light
- **Improve Personnel Safety**
 - Keep people out of hazardous areas by minimizing operator rounds
 - Gain peace of mind with overpressure ratings from 1.5x to 150x and 2 layers process isolation
- **Access Pressure Data Continuously**
 - Get accurate readings as frequently as once a minute with *WirelessHART*® technology
 - View pressure reading locally with large 4.5-inch (114 mm) gauge face



New to Market Capabilities Deliver Increased Reliability, Personnel Safety and Product Longevity

WirelessHART Protocol

- + Troubleshoot Conditions Faster
- + Gain Real-time Insight
- + Communicate to Remote Locations

Local Status Indication *Blinks Every Second*



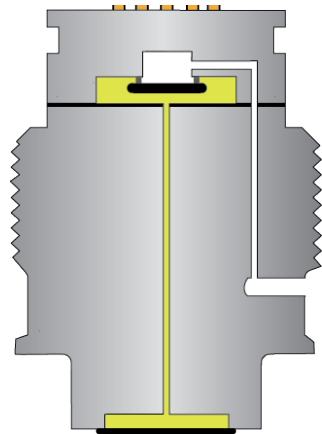
Functioning Properly



Battery is Low



Battery replacement required
OR
Device is malfunctioning



Industry Proven Pressure Sensor Technology

- + Multiple Process Isolation Barriers
- + Overpressure (Up to 150x of Scale Range)
- + Burst Pressure (Up to 11,000 psi (758 bar))
- + Robust Product Design (10-year installed life)



Troubleshoot Unexpected Process Conditions Faster and Allow Your Personnel to Focus On Proactive Maintenance

Data Reporting



Communicate process data – all with wireless ease and speed

Pressure Variable
Temperature Variable
Supply Voltage
Device Health

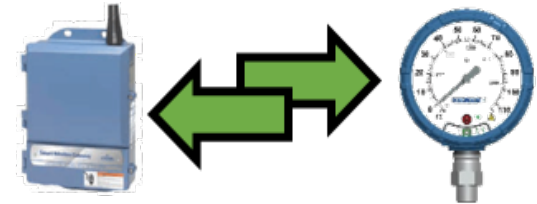
Device Health



Easily verify the gauge is functioning properly

Statuses
Good
Advisory
Maintenance
Failure

Data Availability



Get accurate status and reading as frequently as once a minute

Give maintenance personnel insight into plant operation

Eliminate uncertainties due to infrequent reporting

Leverage the Operational Flexibility of WirelessHART® Protocol

Improve Plant and Personnel Safety



Know the gauge is working
before going out into the
plant

Reduce operator rounds and
eliminate unnecessary trips

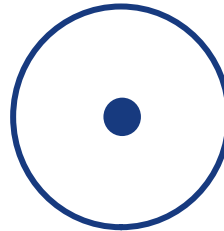
Keep personnel out of
Hazardous Areas

Communicate with Remote Locations

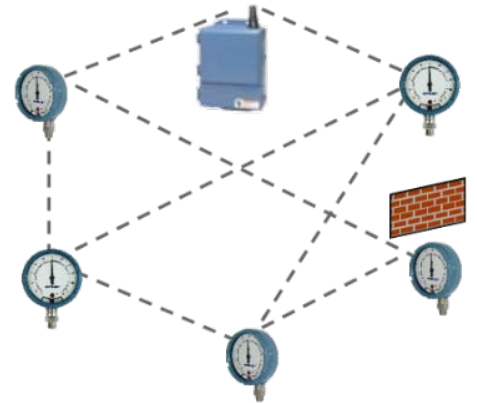


Communication Range
Up to 225 meters (750 feet)

Omni-Directional Antenna



Increase Process Insight

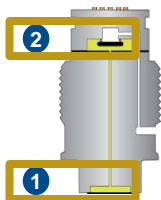


Safely Monitor New Readings
In hazardous or remote
locations

The Rosemount Wireless Pressure Gauge Helps You...

Reduce maintenance challenges with industry-proven sensor technology

Multiple Isolation Barriers



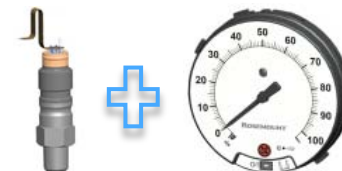
High Overpressure Resistance

Up to 150x of
Scale Range

Burst Pressure Limits

Up to 11,000
psi
(758 bar)

Reduced Mechanical Components



Improve personnel safety with enhanced gauge quality and reliability

Robust Product Design

10-year
installed life

Brand

ROSEMOUNT™

Status Indication



Battery Life



Verify pressure readings without leaving the control room

Personnel Safety



Data Reporting



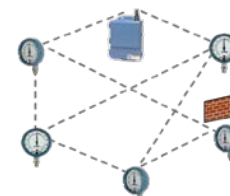
Data Availability



Access Remote Locations



Process Insight



Eliminate T-wells with Rosemount X-well™ Technology!



Leak Points

EXTERNAL



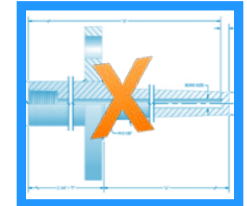
Welding



Maintenance
and
Process Shutdown

EXTRAPOLATED

Process Measurement
from
Surface Measurement



Cost

X-OUT THERMOWELLS



Complexity



Wake Frequency Calculations



Change Requests

Current Temperature Measurement:

Traditional Thermowell Assembly

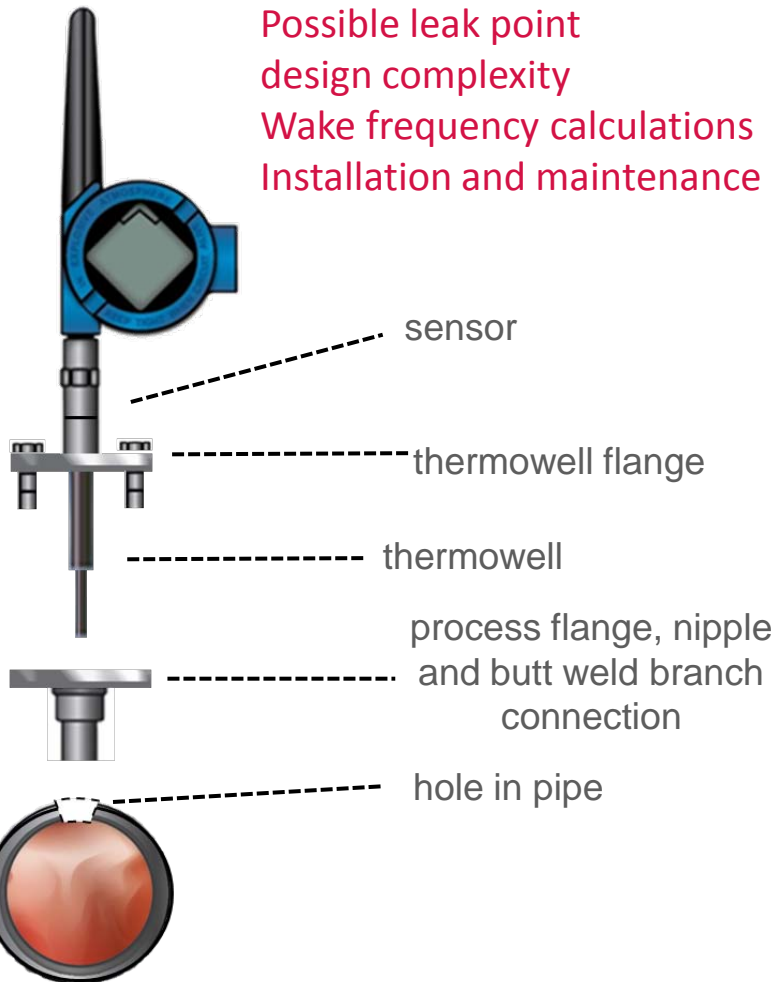
Accurate process temperature

Possible leak point

design complexity

Wake frequency calculations

Installation and maintenance



- Pipe penetration required
 - Introduces possible leak point
- Design considerations: material, length, stem style, process connection
 - Corrosion, abrasion, bending stresses
 - Wake frequency issues
- Many flow lines are too small for practical immersions into the pipe
- Viscous materials may result in thermowell fouling and inability to control the process
- Maintenance
 - Pipeline intrusions may impede cleaning apparatuses ("pigs")
 - Removal for inspection and cleaning



Current Temperature Measurement: Traditional Surface Sensor Assembly

Surface temperature

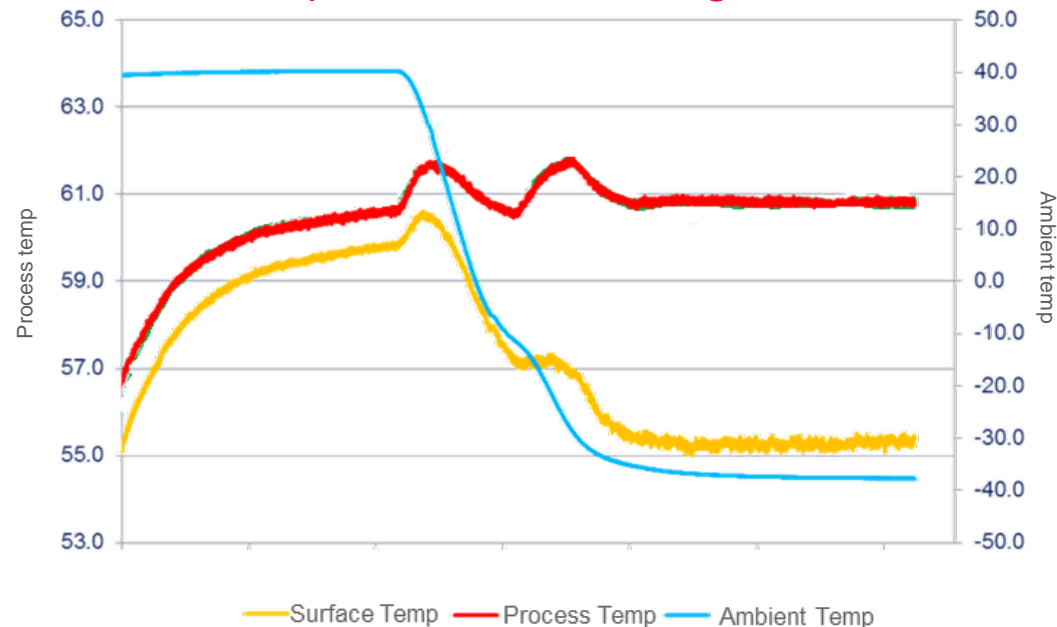
No leak point

No wake frequency calculations

Easy install



- No pipe penetration required
- Simplified design considerations: no wake frequency calculations
- Applicable for small pipe applications
- Applicable for viscous processes
- Reduced maintenance/no process shutdown
- **HOWEVER...surface temperature does NOT give an accurate or repeatable representation of how the process is behaving**



Introducing Rosemount X-well™ Technology!

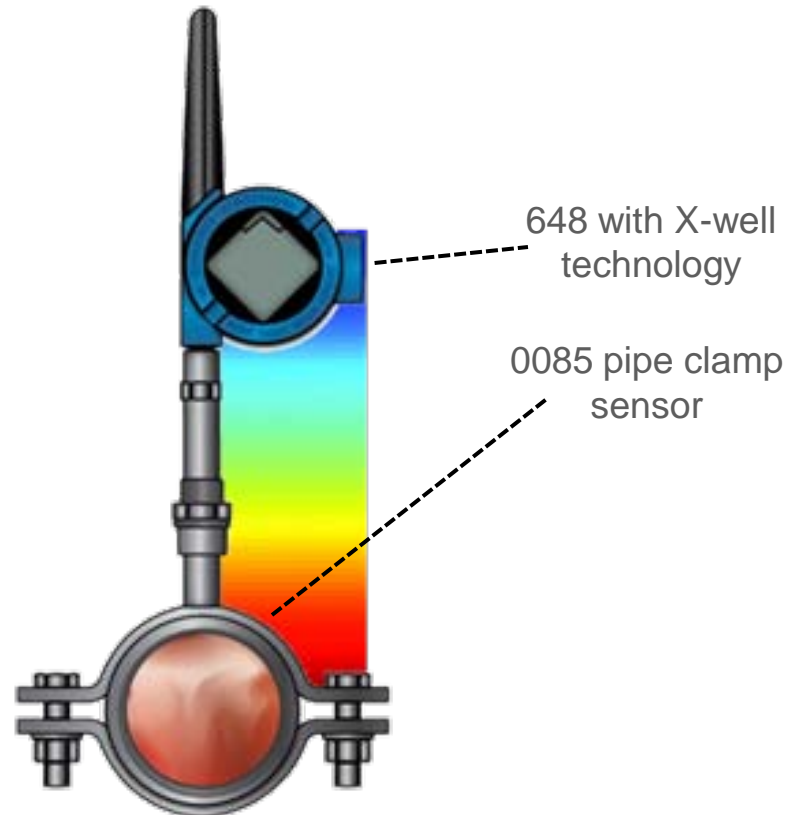
A New Way To Measure Temperature

Accurate process temperature

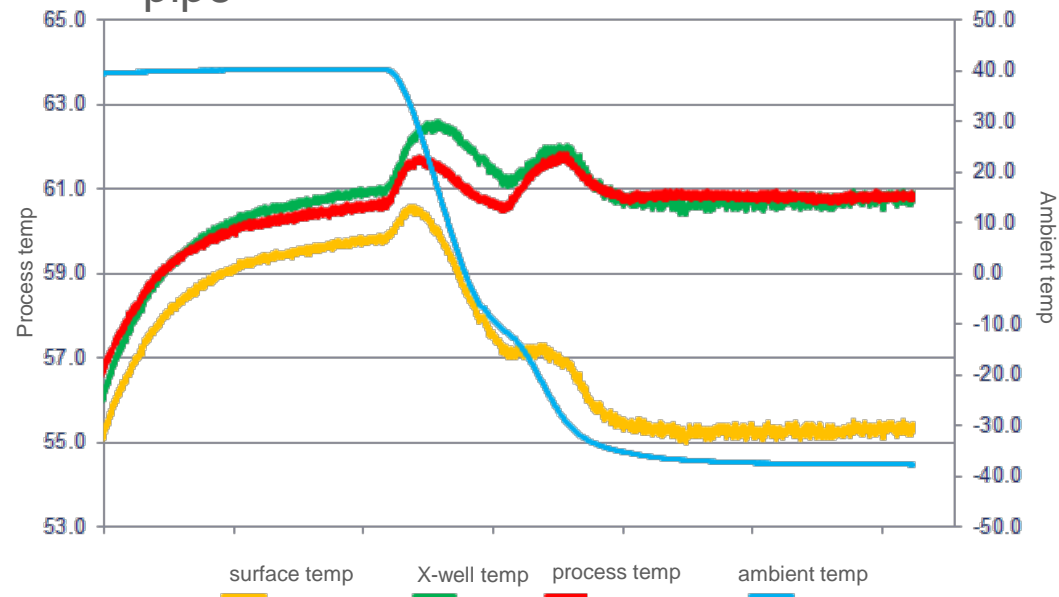
No leak point

No WFC

Easy install



- Complete point solution for measuring process temperature without the requirement of a thermowell or process penetration
- Process temperature calculated via X-well thermal conductivity algorithm which takes into account thermal conductive properties of the temperature assembly and process pipe

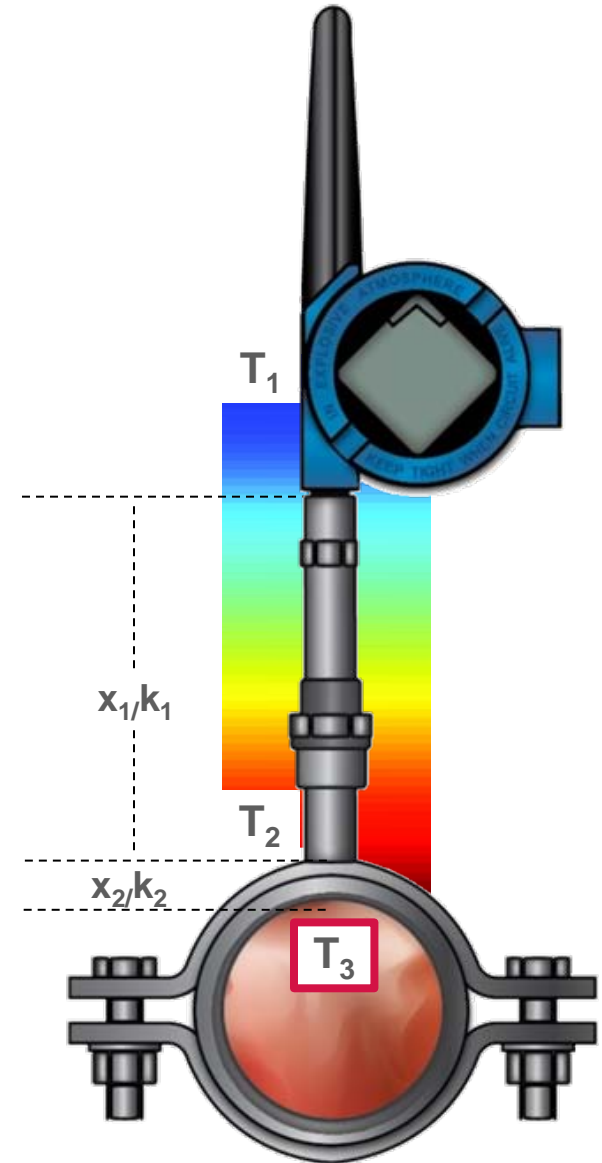


How Rosemount X-well™ Technology Works

- By measuring ambient (T_1) temperature and pipe surface temperature (T_2)

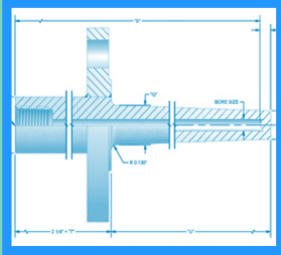
And combining that with...

- An understanding of the temperature measurement assembly's thermal conductivity properties....
- User supplied information on their process piping...
 - Pipe material
 - Pipe schedule
- Rosemount X-well Technology can calculate and extrapolate the process temperature inside the pipe (T_3)



Rosemount X-well™ Technology Eliminates Designing, Purchasing, Installing and Maintaining T-wells

Specification
Design



Design Challenges



‘Designing a thermowell to meet ASME 19.3 is extremely painful’

- **ExxonMobil**

Wake Frequency Calcs



Change Requests



‘Thermowells are a big source of rebuy and redesign mistakes’

- **Mustang Engineering**

Installation



Safety



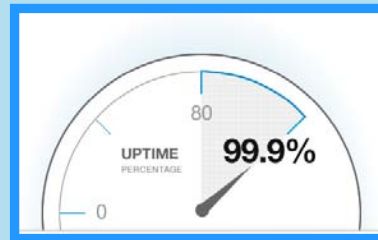
‘Surface sensors lower the risk of leak points and are easier to maintain but we need performance data’

- **BP**

Maintenance



Production



‘During revamps you don’t want to cut the pipe. It would be good to take temperature without cutting pipe’

- **Fluor**

Installation
Maintenance

Rosemount X-well Enables Operational Expense Savings



Increase Production

Reduced process shutdown
increased throughput

Accurate temperature measurement
improved quality
energy savings



Reliability + Safety

No possible leak points

Measurement point does not
contact process/unaffected by
wake frequency
corrosion
abrasive fluids
viscous fluids
bending stresses



Reduce Life Cycle Cost

Reduced maintenance frequency

Simplifies calibration

Easier maintenance
no removal for pigs
no lockout/tagout

Redesign not required for retrofit

OPEX SAVINGS

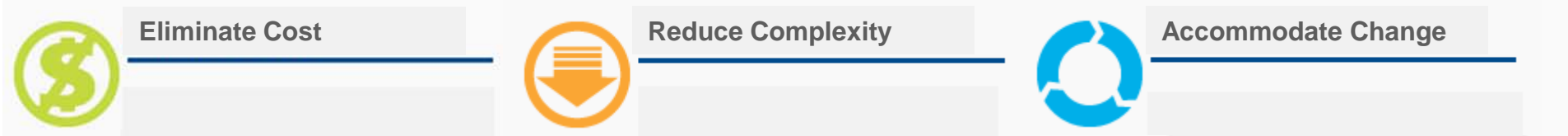
Reduced maintenance intervals

Easier maintenance - less labor

No process shutdowns for calibration or inspection

Accuracy for improved product quality and energy savings

Rosemount X-well Enables Capital Expense Savings



Reduced Installation time

No contractor needed for cutting hole in pipe or welding

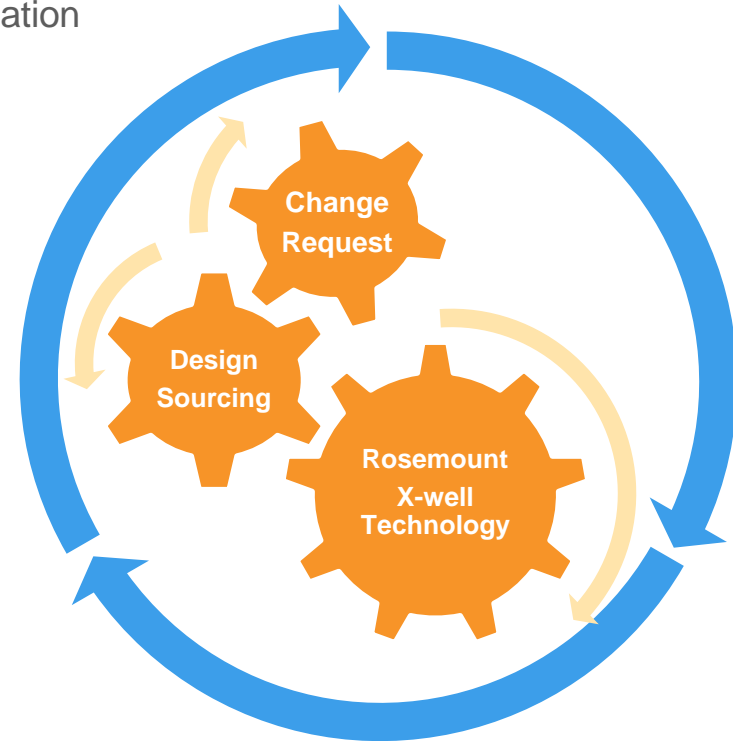
No exotic material requirements

No weld-o-let, nipple, flanges

No WFCs required

Simplified design and specification
process connection
material
immersion length
stem style

Impact from design changes minimized



CAPEX SAVINGS

65% Reduction in engineering design time

70% Reduction of installation time

Eliminates WFC process and rework loop

Reduced impact from late design changes

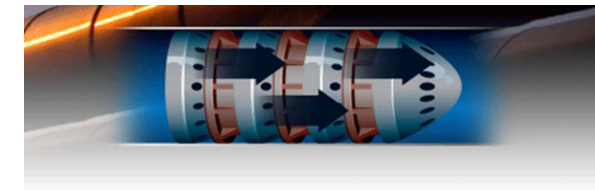
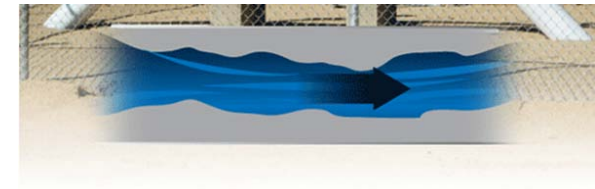
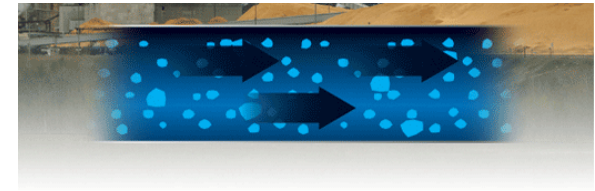
No exotic materials required

Design Specs/Process Data oftentimes change during a project. When that happens, t-wells need to be re-designed, re-calculated and re-quoted. As a result, t-wells often end up on the critical path of a project.

Rosemount X-well Target Applications

- Pipeline monitoring
- Allocation metering applications
- Retrofit projects that need new points
- Pipeline requiring frequent cleaning
- High velocities
- Slurries and heavy particulate fluids
- Wellhead monitoring
- Clean-In-Place (CIP) processes
- High viscosity fluids
- Harsh processes requiring exotic materials

Due to its many benefits, all pipeline applications should be considered candidates for X-well™ technology with exceptions being safety loops, fast control and custody transfer



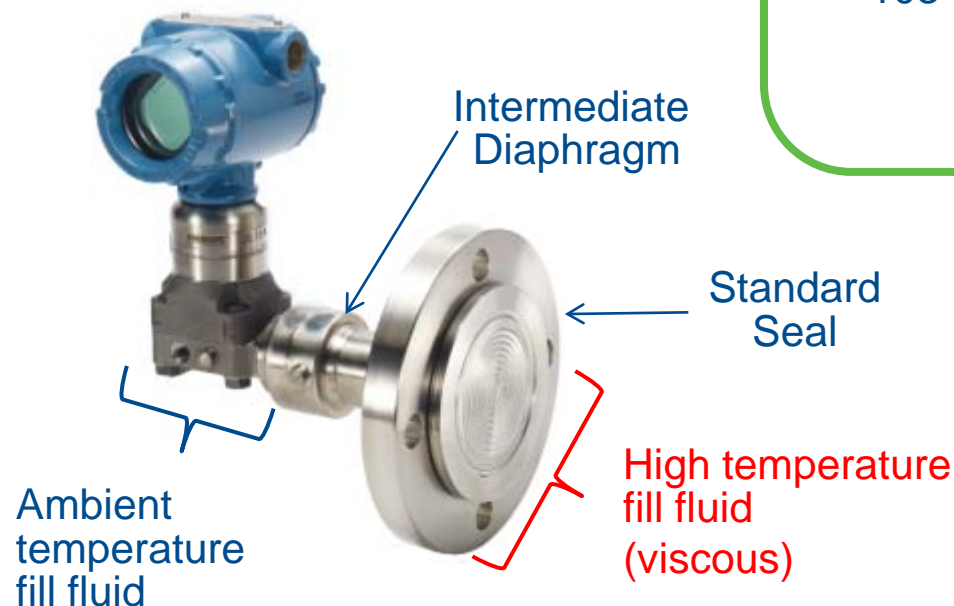
Thermal Range Expander Increases DP Level Capabilities and Application Range

Challenge

- Hot applications (above 200° F) require highly viscous fill fluids
- Heat tracing and other complicated installations are used to keep fill fluids in operating range

Thermal Range Expander

- Maximize performance of high temperature fill fluids
 - Silicone 704
 - Silicone 705
 - UltraTherm™ 805
- Reduce response time



Value

- Eliminates the need for expensive heat-tracing
- Ability to measure extreme processes
- Ambient temperatures down to -103° F (-75° C)

Thermal Range Expander Combines Two Fill Fluids with an Intermediate Diaphragm

Direct Mount Capabilities:

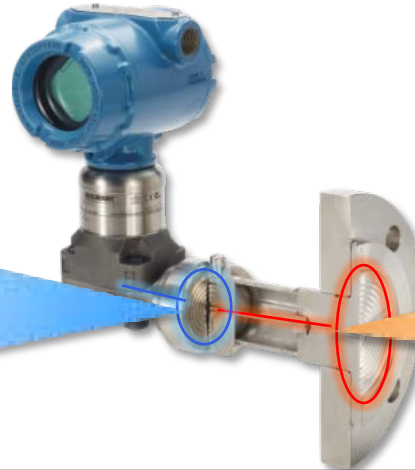
- In-line or Coplanar® style
- ERS™ system capability
- One primary and one secondary fill fluid

Secondary fill options:

- Silicone 200
- SYLTHERM XLT

Primary fill options:

- Silicone 704
- Silicone 704 for vacuum
- Silicone 705
- Silicone 705 for vacuum
- UltraTherm 805
- UltraTherm 805 for vacuum



Remote Mount Capabilities:

- In-line or Coplanar style
- Tuned-System assemblies or Balanced systems
- Select primary and secondary fill fluids for high and low side

Primary fill options:

- Silicone 704
- Silicone 704 for vacuum
- Silicone 705
- Silicone 705 for vacuum
- UltraTherm 805
- UltraTherm 805 for vacuum

Secondary fill options:

- Silicone 200
- SYLTHERM XLT

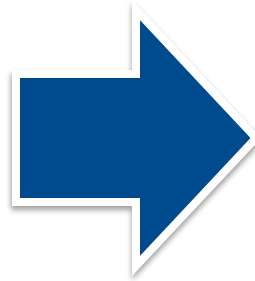
Primary fill options:

- Silicone 704
- Silicone 704 for vacuum
- Silicone 705
- Silicone 705 for vacuum
- UltraTherm 805
- UltraTherm 805 for vacuum



Petrochemical Plant Eliminated Expensive Heat Tracing with Thermal Range Expander

Heat Traced Balanced System with Temperature Controller



Thermal Range Expander



- Operating temperature more than 375 Deg C with Vacuum conditions
- Customer had been using heat tracing to meet the given Process conditions
- Additional Opex cost and high maintenance

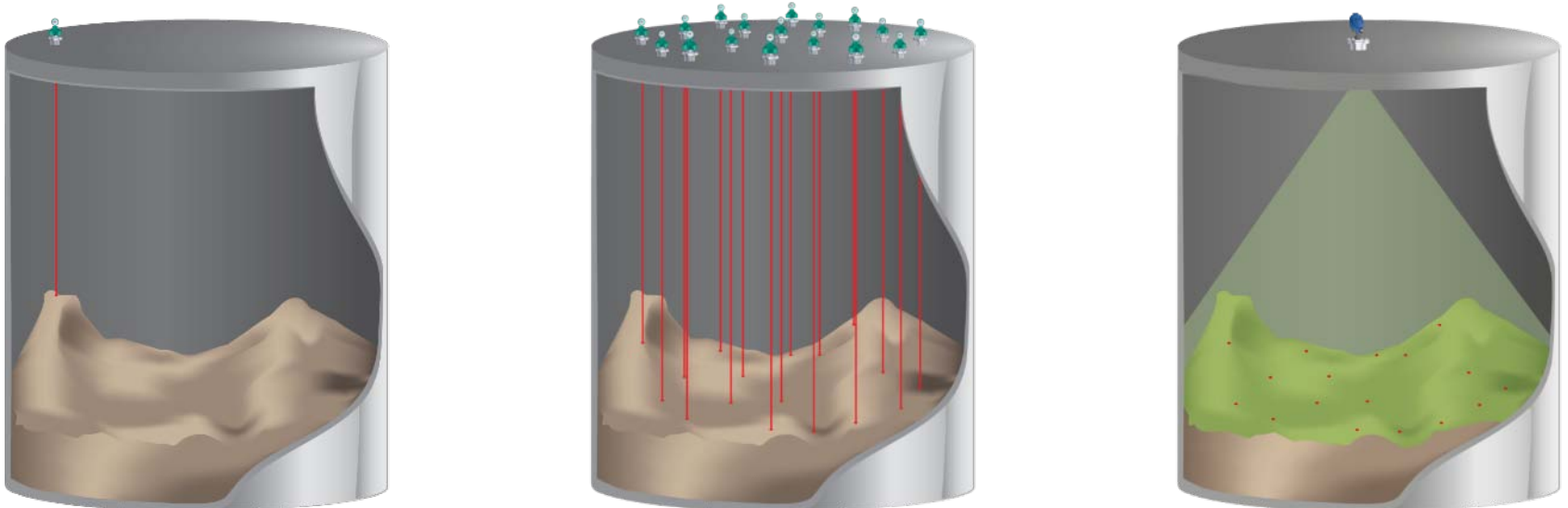
- Save up to 60% cost when compared with heat tracing systems
- No need of onsite wiring and controller
- Very fast response time especially for critical loops

Single Device offering a Multi-Point Measurement

Single point – Simple but not representative volume

Multiple single point devices – Complex but representative volume

Multiple point measurement – *Simple, cost effective and reliable volume!*



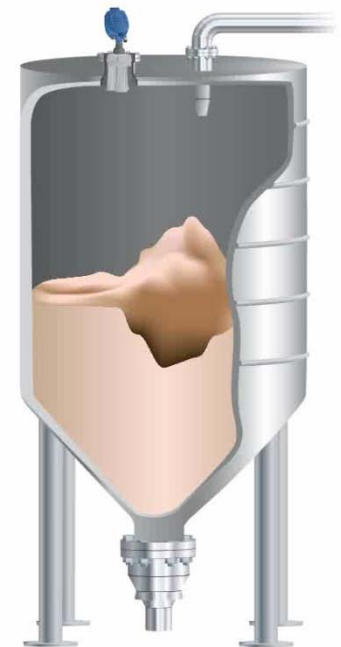
Operating Principle

Top-down, direct volume measurement

- Low frequency **acoustic waves** are emitted from the antennas
- The device collect echoes from **multiple points** to measure the **exact volume**
- Based on the returning echoes, a **3D visualization** is created
- In the case of big silos, several Rosemount 5708s can be **connected in a system**



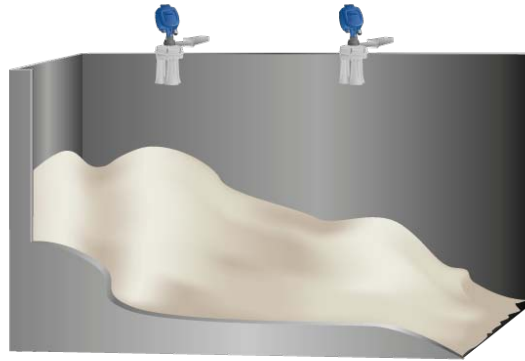
**Rosemount 5708
Series 3D Solids
Scanner**



Typical Applications

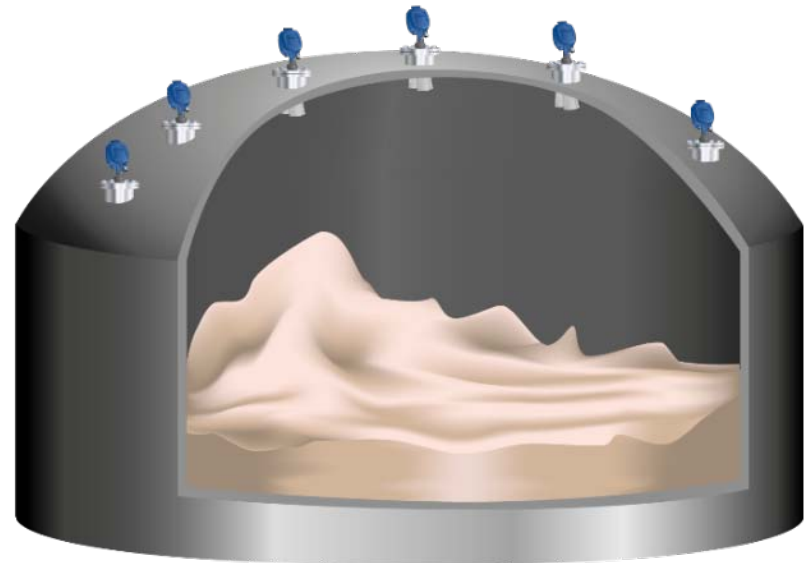
Open bins

- Irregular surface
- Volume measurement



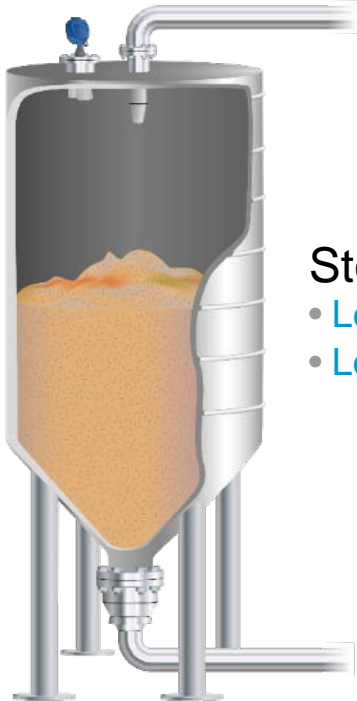
Storage domes

- Large areas
- Massive volume
- Irregular surface



Storage silos

- Level and volume measurement
- Long range



With Rosemount 5708 You Can...



Increase the productivity of your plant with:

- True volume of your solids
- Multiple point measurement
- No silo size limitation



Reduce unplanned downtime with:

- Self cleaning antenna
- Dust penetrating technology



Trust your operation is under control with:

- 3D visualization
- Automated measurements

Nestle Singapore reaps the benefits of Reliable Inventory Monitoring using 5708 3D Solids Scanner



Challenges

- Medium is Tapioca flour, Raw Ingredient for Milo Powder
- Silo Height : 11.6 m, Diameter : 5.4 m
- Previously using Non Contact Radar (Single Point Measurement)
- Level signal lost during filling and discharging, making it difficult to monitor and control

Solution

- 5708 3D Solids Scanner with 3D Visualization
- Level, Volume, Mass and 3D Mapping from a Single Device

Benefits

- Level measurements were more Consistent and Reliable, during filling and discharging
- Increased Process Efficiency and Productivity
- Better Inventory Control
- Reduced Maintenance

TPI Polene installed the largest 5708 Multi-Scanner System in Asia to optimize their Silo Operations



Challenges

- Silo was 90 m in diameter and 70 m in Height
- Single Point, Manual Sounding Measurements lacked a representative Level, Volume
- Poor Tracking during filling and emptying
- Buildups caused concerns on Maintenance
- Operators had to climb the silo for Visual Inspection, posing a huge Safety risk

Solution

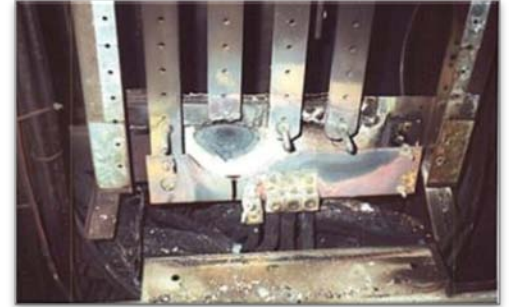
- 16 units of 5708, equipped with Wireless Transmission capabilities
- Level, Volume and 3D Visualization

Benefits

- Eliminated periodic visual inspections, reducing safety risks and saving labor cost
- Enhanced visibility of surface and silo operations real-time
- Better planning for Maintenance and Shutdown

3 Primary Causes Of Electrical Asset Failure

- **Compromised Connections**
 - Poor contact, connections, corrosion, wear, or loosening
 - Results in **Elevated Heating**
- **Insulation Degradation**
 - Aged, worn, or damaged insulation creates dielectric breakdown
 - Results in **Corona** and **Partial Discharge**
- **Air Dielectric Breakdown**
 - Excess environmental moisture and condensing atmosphere
 - Results in tracking and flashover from **High Humidity**



IntelliSAW

- Critical Asset Monitoring (CAM) Platform



Real-time, Continuous Monitoring for the 3 Primary Failure Modes of Electrical Power Critical Assets

SENSORS



Temperature

Addresses overheating



Partial Discharge

Addresses conductor insulation breakdown



Humidity

Addresses air dielectric breakdown

MONITORING UNITS



CAM-4

- Touch panel HMI
- Monitoring capabilities
- Display and log data for up to 7 external Readers
- Onboard data storage
- Multiple communication protocols



Reader

- Remote Monitoring
- Modbus RTU (RS485)

Get What You Need, When You Need It with our Singapore Quick Ship & Repair Center

- Same day / Next day Shipment of High Running New Rosemount Products

Product	Lead-time	Quantity
Transmitters	1 day	10
DP Level	2 days	2

- Local Inventory and Spare Parts
- Product Repair Capabilities and Diagnosis
 - Damaged diaphragm seals, capillaries
 - Add meter options, SIL2 Certification
 - Pressure leak test, re-calibration, re-tagging
- Calibration and Validation Services
- Agency Approved



Rosemount New Products and Solutions

Today's Presentation



**Wireless
Pressure Gauge**



**X-Well
Technology**



**Thermal Range
Expander**



**IntelliSAW Electrical
Asset Monitoring**



**5708 Series 3D
Solids Scanner**



**3051S with 15
Year Stability and
15 Year Warranty**



**3308 Wireless
Radar
Transmitter**



**3051HT Hygienic
Pressure
Transmitter**



**2160 Wireless Vibrating
Fork Switch**



**248 Wireless Temperature
Transmitter with Polymer Housing**



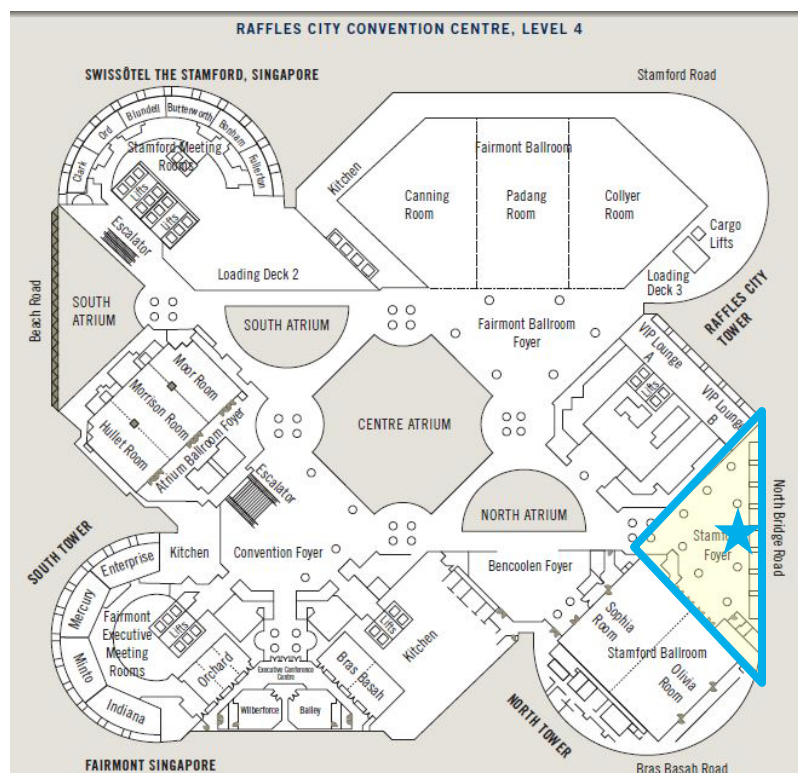
**3051S Electronic
Remote Sensor
System**



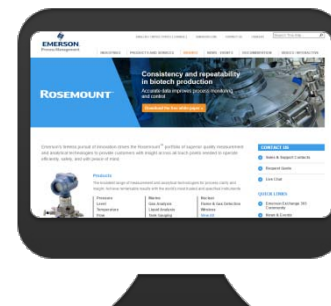
**705 Wireless
Totalizing
Transmitter**

Want to Learn More?

**Visit Us at the Demo Exhibit Area
Starting at 4pm**



Online



<http://www2.emersonprocess.com/en-us/brands/rosemount/pages/index.aspx>

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