

# Process Temperature Measurement without a Thermowell.



## Rosemount™ X-well™ Technology

A faster and simpler way to accurately measure internal process temperature without a thermowell or process penetration.





## The go-to solution for process temperature monitoring



Traditional thermowells can be problematic for a variety of reasons, including introducing potential leak points and undergoing complex and time-consuming design and installation.

Rosemount X-well Technology helps avoid these issues by eliminating the need for a thermowell or process penetration without compromising reliable and accurate process temperature measurements. It measures ambient and pipe temperatures, then calculates process temperature using a thermal conductivity algorithm created by Emerson, the first company to introduce non-intrusive process temperature measurement.

**ROSEMOUNT**



Rosemount X-well changes the rulebook! It's a refreshing innovation that eliminates temperature measurement obstacles.  
—Major Chemical Plant Operation Manager

### Improve Safety

Without the need to penetrate the pipe, you can:

- Add temperature points without having to shutdown the process
- Eliminate potential leak points
- Prevent unexpected process releases
- Avoid concerns about process compatibility

### Reduce Costs

- Avoid cutting and welding with easy install application, which allows for up to 70% faster commissioning
- Eliminate outside contractor and design expenses, saving up to 30% per temperature point
- Standardize and reduce inventory by eliminating the need for multiple thermowell and sensor configurations
- Remove the need for exotic materials of construction
- Reduce maintenance without need for thermowell inspection

### Decrease Design Complexity

Save up to 65% in both engineering and design time

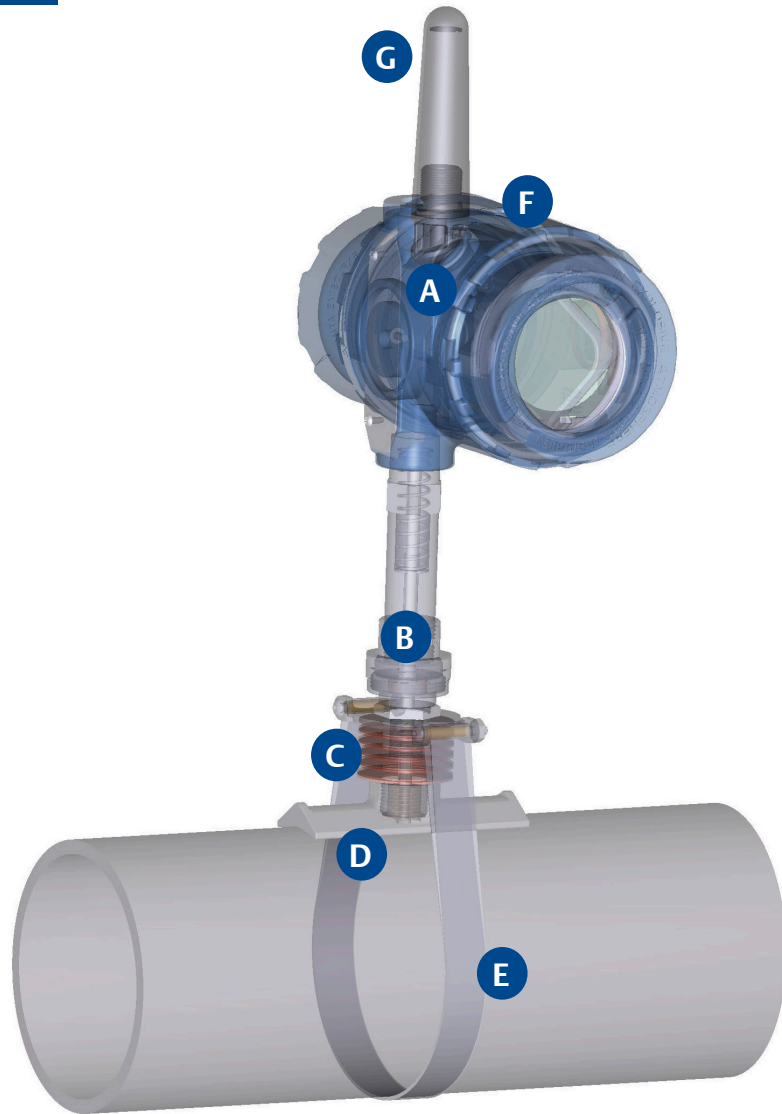
- Forgo the need to perform wake frequency calculations
- Decrease time needed for material compatibility selection
- Eliminate complex decision-making required to determine location, style, and insertion depth of thermowells

### Increase Flexibility

- Prevent a stall or slowdown in start-ups when last minutes changes occur late in the project
- Avoid issues obtaining measurements on pipes with heavy slurry, high velocity flow, caustic materials, or small line sizes
- Introduce new temperature points where previously not possible, such as extreme applications or process conditions, at any time
- Retrofit or move your temperature measurement without an issue



## Constructed for easy use in tough environments



### A. Rosemount X-well Technology Algorithm

An internal software algorithm built into the transmitter calculates accurate process temperature in real time.

### B. Built-in Temperature Sensors

Two sensor configuration provides input into software algorithm to determine process temperature. Spring-loaded design ensures proper sensor contact with the pipe surface.

### C. Spring-Loaded Pipe Mount Design

Maintains installation integrity as pipe expands or contracts.

### D. Convenient Pipe Clamp Foot

Easy mount capability in a matter of minutes. Fits a variety of pipe sizes.

### E. Universal Mounting Band

Cut-to-fit banding for one-size-fits-all easy installation.

### F. Dual Compartment Housing

Keep moisture and contaminants away from electronics. Internal connections are potted to reduce the risk of failure due to harsh conditions.

### G. Wired or Wireless Communication

Using *WirelessHART*<sup>®</sup> output, the Rosemount 648 transmitter enables the ultimate easy-to-install solution: no intrusion, no wires. Also available with traditional 4–20 HART output using the Rosemount 3144P transmitter.

## Easy to spec and commission

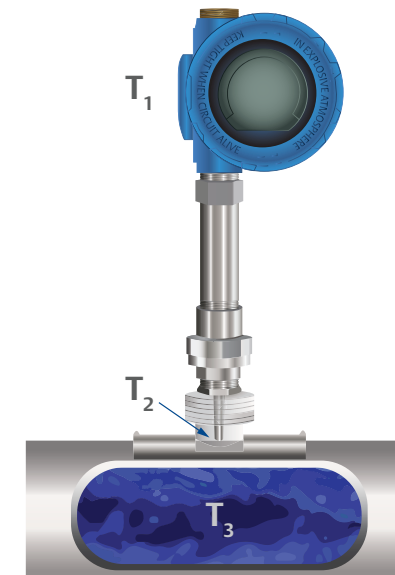
Most temperature measurements can be commissioned in less than an hour. Specifying and configuring a Rosemount X-well device is easy and requires only three basic parameters.

**Pipe diameter:** Rosemount X-well fits a half inch to 60-inch pipe diameters. Specify your pipe size for proper clamp fitting.

**Pipe schedule:** Used to determine overall pipe thickness in combination with the pipe diameter.

**Pipe material:** Materials affect thermal conductive properties. This data is also needed for proper device set up.

## Obtain accurate process temperature measurements without pipe penetration with proven algorithm



## How Rosemount X-well Technology Works

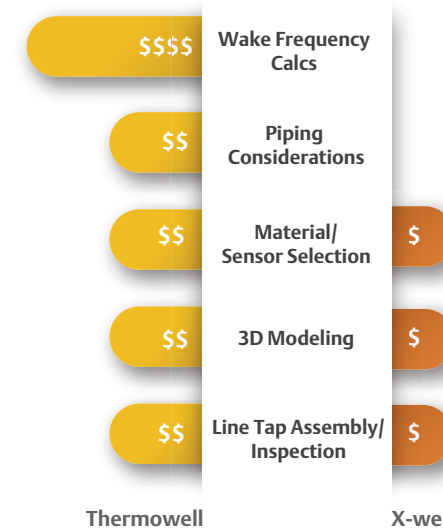
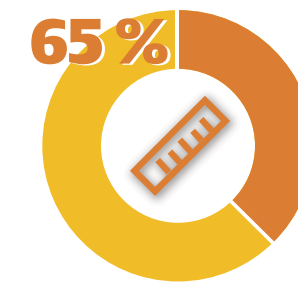
Rosemount X-well Technology uses an algorithm that understands the thermal conductive properties of the temperature measurement assembly and corresponding piping or vessel. Using this information, a surface temperature sensor solution can be utilized to accurately calculate internal process temperature.

The algorithm incorporates real-time external temperature measurements (T1 & T2). User-provided pipe size, schedule, and material are used to determine the pipe's thickness and thermal conductivity.

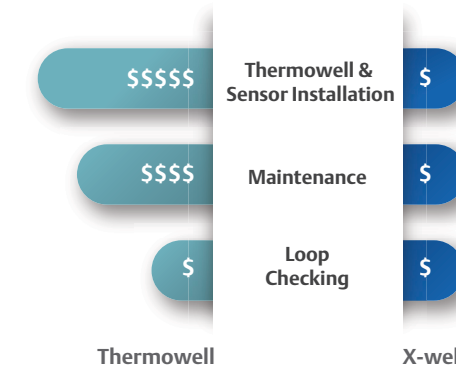
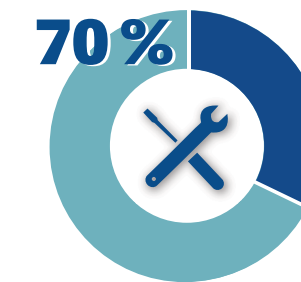
By applying Fourier's Law, heat flux can be calculated and used to solve for the internal process temperature (T3). This allows Rosemount X-well Technology to perform with similar accuracy to a traditional insertion thermowell and sensor configuration.

## Installation, engineering, and design time savings allow for lifetime cost savings

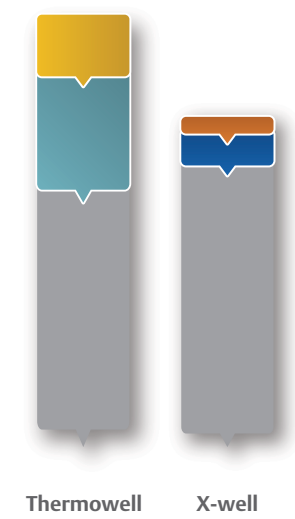
### Design & Engineering Cost Savings



### Installation & Maintenance Cost Savings



### Total Cost of Ownership



■ Instrumentation  
■ Installation & Maintenance  
■ Design & Engineering

Several traditional engineering and design considerations of a pipe intrusion, such as Wake Frequency Calculations, are eliminated with this technology.

The elimination of a thermowell significantly reduces the time it takes to install and service the instrument over time.

Through reductions in Design, Engineering, Installation, and Maintenance costs, Rosemount X-well Technology reduces the total cost of ownership by 30%.

Obtain the same accurate and repeatable process temperature measurements without the hassle of a thermowell.



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