

# Rosemount X-well Technology Prevents Wide Range Error Measurements and Improves Safety in Liquid Ammonia Pipeline

## Results

- Minimize temperature errors for surface measurement
- Easy and fast installation with no boring of holes
- Stability in temperature measurement with safe production



## Application

Temperature measurement of liquid ammonia pipeline in ammonia production intermediate equipment.

## Customer

A manufacturer and distributor of diversified chemical products (e.g., monoammonium phosphate, phosphoric acid, sulphuric acid, synthetic ammonia, phosphatic compound fertilizers) based out of Yunnan, China.

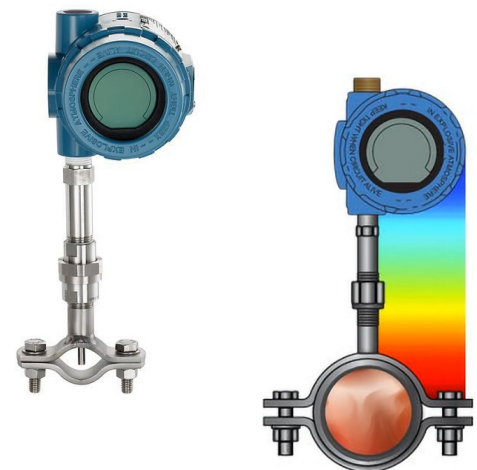
## Challenge

Ammonia flows through the pipeline in the ammonia production unit in liquid form. A traditional patch sensor installed on the pipeline is used to measure the temperature, and data is then transmitted to the distributed control system (DCS). Temperature readouts range from 0 °C to 200 °C.

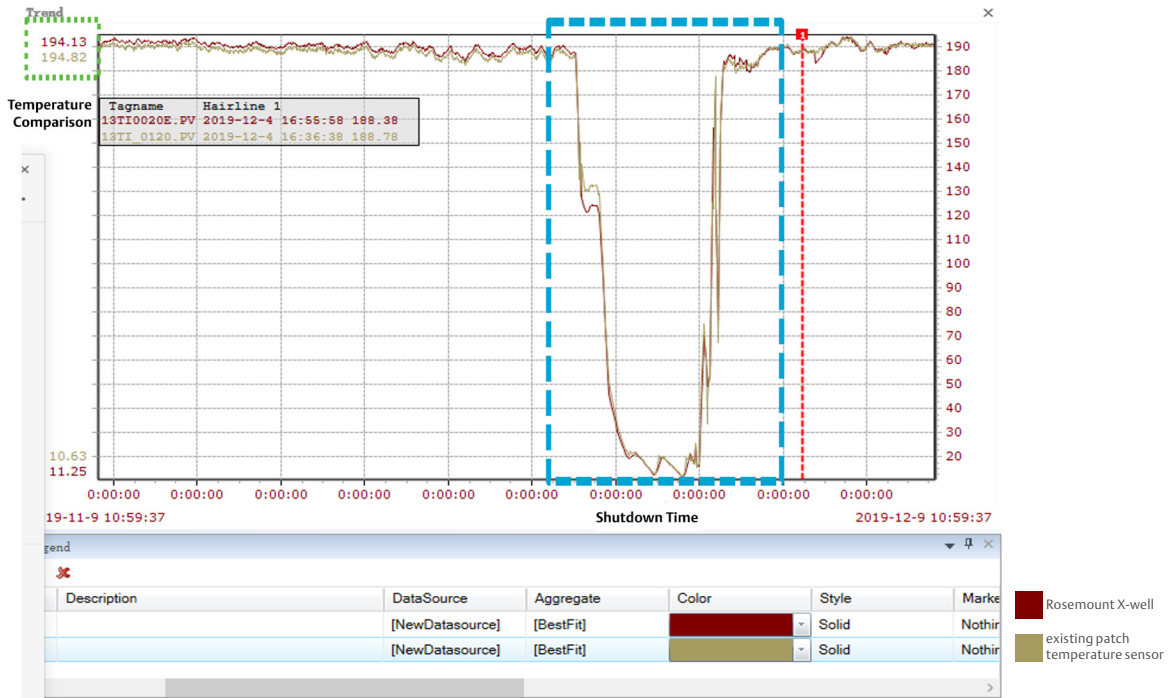
Low level sensor signals from RTDs and Thermocouples are quite susceptible to Electromagnetic Interference (EMI), Electrostatic Discharge (ESD), and Radio Frequency Interference (RFI). Sensor leak act like an antenna for noise interference causing a potential wide range measurement error. The system installed in the temperature loop suffered from large static compensation error resulting in inaccurate measurement readings at the control system. These inaccuracies also pose safety risks in the process unit. To prevent hazards, the management instituted a plant-wide policy to ensure that the readings on the ammonia pipeline is highly accurate. The challenge is to minimize temperature reading errors below its current range of +/- 1% of span.

***"Rosemount X-well Technology helps us to achieve online temperature measurement and high accuracy measurement helps us to improve production safety."***

Plant Manager



Rosemount™ X-well™ Technology



A side by side comparison of the Rosemount X-well showing marked performance improvement at the DCS versus existing patch temperature sensor as evidenced by decreased noise/error and smoother curve.

**Solutions**

Emerson recommended Rosemount X-well Technology with Rosemount 3144P Temperature Transmitter to improve measurement accuracy and reduce safety risks due to errors in readings. This provides a complete point solution for accurately measuring process temperature without the need for a thermowell or process penetration. Rosemount X-well Technology calculates a repeatable and accurate process temperature measurement via an in-transmitter thermal conductivity algorithm. With simple clamp design, pipeline modifications, hole drilling, welding and fixture insert are not required.

With the Rosemount X-well Technology, customer is able to get accurate and quick temperature readouts from the DCS, enabling effective Hazard and Operability Analysis (HAZOP) for the liquid ammonia pipeline over an extended period. There is no need to stop the equipment and maintain the sensors. The Rosemount X-well Technology is also SIL3 Capable: IEC 61508 certified by an accredited third party agency for use in safety instrumented systems up to SIL3. Overall, customer is able to realize the benefits of more accurate and quicker temperature readouts while improving safety and reducing maintenance hours.

## Resources

Emerson Automation Solutions Industries

[Emerson.com/Chemical](http://Emerson.com/Chemical)

Rosemount X-well Technology

[Emerson.com/Rosemount-Xwell](http://Emerson.com/Rosemount-Xwell)

White Paper

Get a copy of our White Paper at <http://emr.sn/NM27>

Flyer

[Temperature Measurement Assembly with Rosemount X-well Technology](#)

Videos

[Rosemount X-well How it Works](#)

[Rosemount X-well Overview](#)

[Rosemount X-well Non-intrusive Temperature Measurement](#)

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