

# Solvay Improves Quality and Throughput of PVC Rotary Dryers with Emerson's Wireless Temperature Monitoring

## RESULTS

- 50% reduction in off-spec production from dryers
- 1-2% increase in average production
- Improved powder drying quality



## APPLICATION

Temperature monitoring on polyvinyl-chloride (PVC) rotary dryers

## CUSTOMER

Solvay in Jemeppe-sur-Sambre, Belgium

## CHALLENGE

Solvay's PVC plant in Jemeppe-sur-Sambre, Belgium was facing regular problems of temperature stability on rotary dryers. "We could only measure the outlet temperature of the dryers because we could not find a reliable temperature solution for rotating equipment", said Mr. Willy Destate, Head of the Research Department AMRA/ELEC for Solvay Jemeppe-sur-Sambre. "But a single measurement point at the dryer outlet was not enough to properly control these units, which have significant thermal inertia due to their size".

Drying is a critical part of the PVC production process, with the goal being to reach specific quality metrics such as moisture content. Since it is a continuous process, the temperature must be high enough to drive off moisture at the proper rate as determined by the flow or throughput. If the temperature is too high, however, the polymer can begin to degrade and discolor.

"We were struggling to operate the rotary dryers properly," said Mr. Destate. "Without the right temperature measurements, we had a significant number of discarded batches." The plant needed a solution to monitor temperature of the PVC at multiple points throughout the dryers.

## SOLUTION

Solvay selected Emerson's Smart Wireless solution, which is based on the IEC62591 (*WirelessHART*<sup>®</sup>) standard, to provide on-line temperature monitoring of the polyvinyl-chloride at multiple points throughout the dryer. This solution eliminated the need to install a new cable

***"On-line wireless monitoring has enabled operators to prevent excessive temperatures in the rotary dryers, leading to a 50% reduction in off-spec production."***

***Mr. Willy Destate***

*Head of Research Department  
Solvay Jemeppe-sur-Sambre*



*Three 648 wireless temperature transmitters were installed with RTD's and thermowells and distributed along the length of the dryer, 120° out of phase.*

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infrastructure and any slip ring/collector traditionally required for rotary equipment. "After an unfortunate experience implementing a competitive wireless technology on this site, the solution provided by Emerson allowed us to move quickly in this difficult application," said Mr. Destate.

Three Rosemount Wireless 648 Temperature Transmitters (with RTDs and thermowells) were installed and distributed along the length of the dryer, out of phase by 120°, and connected to the DeltaV™ control system through a 1420 Wireless Gateway. Wireless data was integrated into the DeltaV without consuming additional I/O. The gateway was installed inside the control room, with a remote antenna outside on the roof of the highest building to enable communication to wireless temperature transmitters later placed on a second PVC rotary dryer. Nine repeaters were placed throughout the plant to develop a robust network for the two dryers as well as future wireless needs.

Finding the locations and ideal immersion length of thermowells was a challenge. The dryer construction is quite complex, with two different heating sources located on the inside. There are three internal water heat exchangers located on the inside wall (at 97 °C), as well as an air stream (at 110 °C) injected in counter-current flow to the process fluid. "The PVC flows around the air stream in order to optimize the heat exchange," said Mr. Destate. "The difficulty was to measure the PVC stream and not that of the air stream or heat exchangers."

Thermowell insertion was made more difficult with the three water heat exchangers located around the inside wall. Empirical successive immersion lengths enabled the team to find the proper immersion length by using different spool pieces. The right locations along the length of the dryer were found, and the right immersion length discovered.

"On-line wireless monitoring has enabled operators to prevent excessive temperatures in the rotary dryers, leading to a 50% reduction in off-spec production," said Mr. Destate. "We improved quality with better powder drying, and have realized a 1-2% increase in production."

## RESOURCES

### Emerson Process Management Chemical Industries

[www.emersonprocess.com/chemical](http://www.emersonprocess.com/chemical)

### Emerson Smart Wireless

[www.emersonprocess.com/wireless](http://www.emersonprocess.com/wireless)

### Rosemount 648 Wireless Temperature Transmitter

<http://www2.emersonprocess.com/en-US/brands/rosemount/Temperature/Single-Point-Measurement/648-Wireless/Pages/index.aspx>

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*Thermowell insertion length/ placement was a key factor because of the complexity of heat exchange methods used inside the dryer (shown).*



*A remote antenna on the gateway enables communication to both rotary dryers as well as future applications.*



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