

# Digital Transformation helps Toagosei Singapore Improve Operation Efficiency and Enhance Plant Safety

## RESULTS

- Improved operational efficiency with digitalization of work processes and reduced manual processes
- Mitigation of fouling risk in heat exchanger resulted in 1200 tons of steam savings per year
- Improved water chiller's internal monitoring system led to optimized water supply processing, resulting in savings of 35,000kWh energy per year
- Seamless wireless CCTV integration enabled 24/7 video monitoring of critical workplace areas, ensuring personnel safety



## APPLICATION

Energy efficiency in waste heat recovery exchanger and chiller system, and safety monitoring for critical plant area.

## CUSTOMER

Toagosei Singapore Pte Ltd is a chemical plant that manufactures organic industrial chemicals, synthetic resins, chemical fertilizers and acrylic acid esters.

## CHALLENGE

Singapore's Energy Conservation Act requires companies to take steps towards better managing their energy consumption and improving energy efficiency. To comply with the act, Toagosei needed to add new pressure and temperature monitoring points to the existing heat exchangers in their plant. However, there are limited cabling infrastructure and a restricted number of input/output (I/O) ports for the Distributed Control System (DCS) in the plant. Manual recording using analog gauges was not an option due to likely human error.

Additionally, it was discovered that the existing chiller system consumed 40% of the overall plant electricity. As the chiller system was designed to have higher load than the actual requirement, resulting in poor energy efficiency.

Toagosei also wanted to ensure that manual handling tasks (i.e. lorry filling/discharging, power charging) in the plant are implemented in accordance with proper safety practices to help ensure worker safety.

*“By leveraging Emerson’s Digital Transformation technology and solutions, we are able to achieve operation excellence with improved energy consumption and workforce safety.”*

Ivan Goh  
General Manager, Toagosei Singapore Pte Ltd



Rosemount 2051 Wireless Pressure Transmitter and Rosemount 648 Wireless Temperature Transmitter

## SOLUTION

Rosemount™ 2051 Wireless Pressure Transmitters and 648 Wireless Temperature Transmitters were deployed at the inlet/outlet shell of the 15 heat exchangers to gather data and manage fouling. Wireless transmitters eliminated the need for cables and DCS I/O ports. Data from the wireless transmitters is sent to the Emerson Wireless Gateway at a one-minute interval and sent to the DCS using ethernet communication.

To monitor the chiller system's efficiency, Rosemount 648 Wireless Temperature Transmitters were installed to monitor the temperature of evaporator and condenser approach. A high evaporator approach temperature could indicate an unbalanced chiller system, such as lack of refrigerant or uneven refrigerant distribution due to a faulty mechanism, while a high condenser approach temperature could indicate fouling or change in chemical properties of the refrigerant fluid. The chiller system's pump was also monitored with Rosemount 2051 Wireless Pressure Transmitters.

CCTVs were also integrated seamlessly with the additional Wi-Fi® backhaul feature of two existing Emerson Wireless Gateways and Cisco® Wireless Access Points. As a result, site activities can be monitored in critical areas and personnel safety can be monitored live from the plant's control room.

## RESOURCES

### Rosemount 2051 Wireless In-Line Pressure Transmitter

[Emerson.com/Rosemount-2051-Wireless-Inline](https://emerson.com/Rosemount-2051-Wireless-Inline)

### Rosemount 648 Wireless Temperature Transmitter

[Emerson.com/Rosemount-648-Wireless](https://emerson.com/Rosemount-648-Wireless)

### Emerson Automation Solutions Industries

[Emerson.com/Chemical](https://emerson.com/Chemical)

### Emerson's Plantweb™ Digital Ecosystem

[Emerson.com/Plantweb](https://emerson.com/Plantweb)

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Rosemount 2051 Wireless Pressure Transmitters and 648 Wireless Temperature Transmitters were deployed at the inlet/outlet shell of the heat exchangers to gather data and manage fouling.



Rosemount 648 Wireless Temperature Transmitters were installed to monitor the efficiency of the chiller system.

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