

Producing Process, Cooling, Boiler and HP Boiler Water with Membrane Filtration



THE CHALLENGE

In 2008, Belgian municipal water supplier Tussengemeentelijke Maatschappij der Vlaanderen voor Watervoorziening (TMVW) saw an emerging market for the valorization of surface water, and thus an opportunity to expand into the industrial water supply industry. TMVW decided to create Induss II, a fully integrated water production site in the port of Ghent to serve surrounding industrial customers with water. Ultimately, TMVW in cooperation with Antwerpse Water Werken decided to create Induss, a separate company for industrial water, to take over and operate new and existing plants in the industry in Belgium

In order to successfully infiltrate this new market, the plant operators needed to identify and implement a water treatment system capable of meeting the wide variety of water quality demands and requirements for process, cooling, boiler and HP boiler water. In addition, the solution needed to comply with local regulations regarding the amount of water the plant could extract from the local river, which serves as the main water source. This water also posed a unique challenge as the river quality is highly variable with the seasons and has high salinity due to its close proximity to the sea. High levels of conductivity are faced in the summer months.

Due to footprint restrictions and discharge limits capping a maximum daily flow and limiting hours for peak flow rates, as well as the fact that there was no sewerage or waste water treatment plant available, conventional treatment methods that require coagulants and produce sludge could not be considered. In general, the use of chemicals was limited and required balanced discharge of any residual stream containing chemicals or solids. With these limits, the new water system needed to have a wide capacity range to provide consistent water quality, requiring the RO system to be able to handle a varied range of salinity to maintain high recovery without sacrificing production and quality.

“Pall Water continues to meet our needs and exceed our expectations after eight years of operation. We’re pleased with both the chosen technology and equipment installed along with the ability to operate the system remotely. Given the amount of plants that we operate, it is not feasible to have a technician on-site at each plant so it has been very important that we can control the plant remotely with ease and confidence, and thanks to Pall, we are successfully doing so.”

THE SOLUTION

Ultimately, the Induss II plant selected Pall Water due to its compact, robust and proven membrane solution, along with the company's support and expertise as Induss entered the industrial water market. Facility operators invested in Pall's Aria™ FLEX integrated membrane system, using the advanced pressurized membrane filtration to successfully meet the four different water quality requirements. Pall Water also was selected in large part due to its ability to fit a wide range of capacities within the small footprint, meet the new treatment and flow rate demands and deliver a system that could be operated remotely.

The full turnkey filtration system was built to accommodate future expansion and the ability to scale operations. The original water treatment design scheme included automatic cleaning strainers (300 µm) to remove larger solids and filtration membranes to remove suspended solids and micro-organisms, preventing the reverse osmosis from fouling. It also incorporated first pass reverse osmosis (RO1) to (partially) desalinate the water, second pass reverse osmosis (RO2) as polisher for desalination and electrodeionization (EDI) as final polisher. This concept is flexible to meet the feed water conditions of the operating window.

THE RESULTS

Following the implementation of the Aria FLEX system, the Induss II plant was able to meet feedwater demands and comply with necessary regulations and permit limitations. This was critical for the plant as Induss II's water demand fluctuates due to flow levels and regulations, and the water source soars during the summer months. The flexible system was able to meet all four water treatment demands, producing 80 m³/h of process

water, 180 m³/h for cooling water, 20 m³/h for boiling water and 25 m³/h of HP boiler feed water. The membrane solution has proven critical for capacity, particularly given the system's ability to scale to meet peak demand.

Beyond the added water capacity, the operator-friendly nature of the system was a colossal benefit. Between the plant's remote location in an industrial area and the number of other plants operated by Induss, the ability to operate the plant remotely was necessary as maintenance monitors are only on-site two days a week. With the Aria FLEX platform's fully integrated operating system, facility operators can manage, monitor and adjust water levels remotely with ease. The installation is monitored and operated remotely from Induss' central control room, with minimum on-site intervention.

THE BENEFITS

The Induss II plant in the port of Ghent has been in operation for more than eight years and has successfully delivered on its promise to be seamlessly and remotely operated. The flexible membrane unit has fulfilled the water quality needs of the facility, allowing it to meet water requirements for the variety of industrial water that it delivers. Overall, the Aria FLEX system provided the following benefits:

- Ability to produce numerous water qualities for a variety of industries
- Capability to fully operate the plant remotely
- Ability to scale to meet future demand
- Robust membranes and proven technology



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