

# Solve Issues Related to Water Resources

## Shanghai Kao Chemical Co., Ltd.: Environmental Improvement Case Study (Project by Kurita Water Industries (Dalian) Co., Ltd.)

Shanghai Kao Chemical Co., Ltd. produces surfactants used as raw material in various products such as industrial detergents and cosmetics, as well as casting-related materials. As a member of the Kao Group, Shanghai Kao Chemical is working to reduce its environmental impact in accordance with the Kao Group's basic philosophy and basic policy on environment and safety. The Kao Group aims to reduce water consumption across the entire lifecycle of its products, and as a production plan, Shanghai Kao Chemical is continuously promoting efforts to reduce the amount of water used in production.

Kurita Water Industries (Dalian) Co., Ltd. examined a range of water saving measures with the customer to help tackle the challenge of reducing water consumption. Focusing mainly on reducing industrial water for cooling, which accounts for around 40% of water consumption, we came up with a water saving strategy of recovering the blow-down water from a cooling tower, which was previously treated as wastewater, as well as rainwater and wastewater from a boiler, treating it with a membrane process to reach the standard quality required for cooling water, and then reusing it as supplementary cooling water supply. The introduction of this strategy enabled a reduction of around 70% in the customers industrial water for cooling.



Cooling Tower Blow-down Recovery system

## Voice of the Customer

Kurita is a water treatment specialist and its corporate philosophy is in concord with the Kao Group's vision of "Sustainability as the only path," expressed in its medium-term management plan, as well as the core tenet of Kao's ESG strategy, "Yoki-Monozukuri with ESG integration." Our newly installed Cooling Tower Blow-down Recovery system is compact and offers a stable treatment flow, as well as a high degree of automation and intelligent operation coupled with a high recycled water recovery rate. The introduction of this system has reduced the volume of industrial water used for cooling by around 70%, which translates into an overall reduction of around 40% in both the total annual usage of industrial water and the total wastewater volume for the entire plant. We have also requested ongoing support and maintenance services.



Fan Yiming  
General Manager, Production Department  
Kao (Shanghai) Chemical Industries Co., Ltd.

## Japan Display: Environmental Improvement Case Study (Project by Kurita Water Industries)

The main businesses of Japan Display Inc. range from R&D to manufacturing and sales of various devices such as displays and sensors. As a participant in the United Nations Global Compact, the company has set green tech and sustainability management as part of the basic policies in its growth strategy leading up to 2026. The Tottori plant, Japan Display's development and manufacturing site, has set reduction targets in various categories, including energy-derived CO<sub>2</sub> emissions and total water usage, and is pursuing ongoing environmental activities to achieve these targets.

Kurita Water Industries Ltd. engages in the production and supply of ultrapure water used in production facilities at Japan Display's Tottori plant as well as in the recovery and treatment of wastewater from the plant. Since the plant started operation, Kurita Water Industries has been working with the customer to reduce water usage by promoting wastewater recovery. To help further reduce water usage, after newly confirming the current balance, quality, and properties of water at the plant, Kurita Water Industries proposed two measures to recover water from unrecovered wastewater.

The first was to recover and reuse wastewater by changing the wastewater treatment flow and using an existing wastewater tank as a solid-liquid separation tank. This made it possible to recover and reuse an amount equivalent to 18% of discharge.

In addition, changing the operation of existing RO membrane equipment enabled the treatment of fluorine wastewater. This also made it possible to recover and reuse an amount equivalent to 18% of discharge.



RO membrane unit

### Voice of the Customer

Kurita has promoted wastewater recovery in the past, but this time we received a proposal from the company that would curb initial costs by converting our existing wastewater facilities. To mitigate risks after the facilities restarted, Kurita ran the system on a test basis, which clearly demonstrated the benefits of the upgrade. We hope to continue working with Kurita to improve wastewater recycling, which helps to reduce environmental impact while also saving costs.



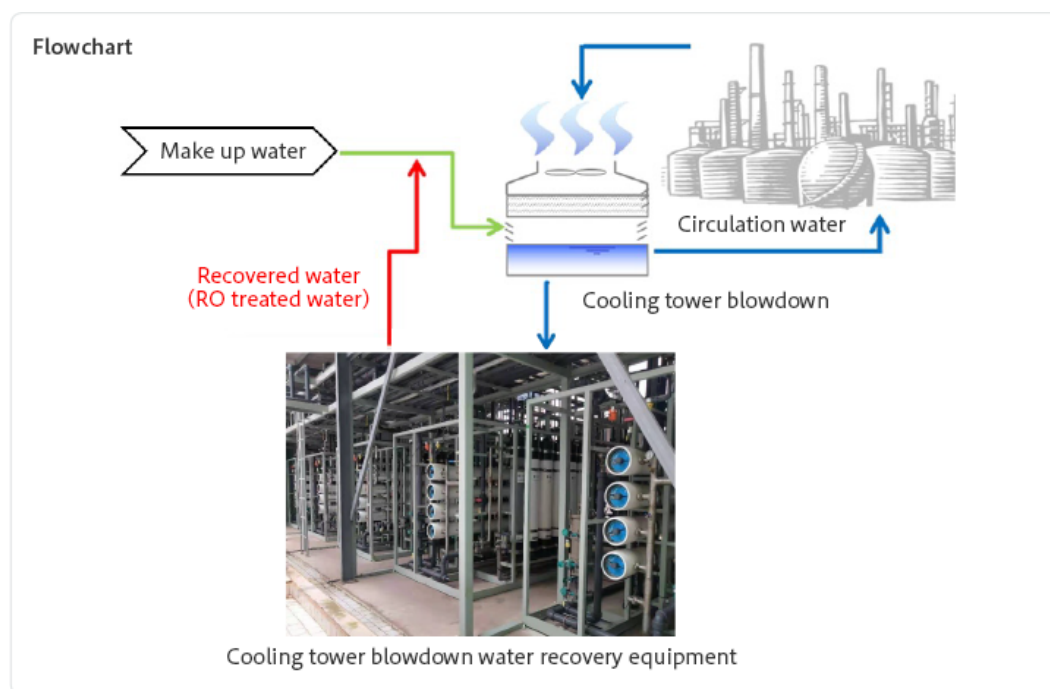
Mr. Koji Izumi  
Senior Manager, Facility Section,  
Manufacturing Department,  
Tottori Plant, Auto Tech Business Unit,  
Japan Display Inc.

## Zhejiang Satellite Petrochemical: Environmental Improvement Case Study (Project by Kurita Water Industries (Dalian))

Zhejiang Satellite Petrochemical Co. Ltd. manufactures chemical products, mainly using propane dehydrogenation (PDH) technology. As part of its environmental protection policies, the Chinese government is calling on companies to save energy, reduce emissions and support China's transition to a low-carbon, green economy. In response, Zhejiang Satellite Petrochemical has been working to conserve water and reduce wastewater.

Zhejiang Satellite Petrochemical's manufacturing plant uses industrial water as cooling water. The quality of the plant's industrial water tended to fluctuate depending on the season, so when water quality declined, the customer was forced to increase blowdown water volume from its cooling towers to ensure the smooth operation of cooling equipment. That in turn led to an increase in the volume of make-up water supplied to the cooling towers and also the amount of wastewater discharged from the plant.

To address that issue, Kurita Water Industries (Dalian) Co., Ltd. developed a proposal to limit the amount of industrial water used by the plant by installing membrane filtration equipment to treat and reuse cooling tower blowdown water within the water quality design parameters of the cooling equipment. The proposal was adopted by Zhejiang Satellite Petrochemical in 2015, helping it save 1.2 million m<sup>3</sup> of industrial water used and discharge water by the end of 2020. The project has set the benchmark for environmental protection in the area and has been highly praised by the local government. Zhejiang Satellite Petrochemical expanded its cooling tower blowdown water recovery equipment in 2021 and expects to save a further 490,000m<sup>3</sup> of industrial water and discharge water each year.



### Voice of the Customer

Kurita is a highly professional water treatment company that provides us with advanced technical support and onsite services in water treatment facility operation. Kurita's cooling tower blowdown water recovery equipment has helped us achieve our targets for saving water, reducing water discharge and cutting costs. Additionally, by improving the quality of local water resources, we are playing our part in the development of the local community. We have seen first-hand how Kurita's advanced technological capabilities provide real value to society.



Mr. Yunwei Su  
Zhejiang Satellite Petrochemical Co. Ltd.

## Seiko Epson: Environmental Improvement Case Study (Project by Kurita Water Industries)

Seiko Epson Corporation's business is focused on the production and sale of printers and related products. To be "an indispensable company" – one element of its management philosophy – Seiko Epson is working to solve social issues through its business activities. At each of its business sites, Seiko Epson works on an ongoing basis to reduce its environmental impact, such as by cutting plant water usage and greenhouse gas emissions, in line with its Environmental Vision 2050.

To help the plant achieve its environmental goals, Kurita Water Industries Ltd. put forward a proposal to reclaim and reuse wastewater from the ultrapure water production systems used in the plant's manufacturing processes. The RO membrane water treatment system, one of the ultrapure water production systems, discharges water with high levels of ions and impurities (brine) from the feed water, but much of the discharged water has been emitted as wastewater. To address this issue, Kurita identified a reprocessing method and an application for reuse at the plant based on the concentration and type of impurities in the brine. Since adopting the proposal, the customer has reduced its potable water usage by around 38,000m<sup>3</sup> per year. The ultrapure water production systems also incorporate a warming step to improve the permeation efficiency of water for production processes. By recovering heat from the reclaimed water, the new system has also reduced the plant's CO<sub>2</sub> emissions by 26 tons per year.



Brine reclamation system

## CMK Corporation Thailand: Environmental Improvement Case Study (Project of Kurita-GK Chemical)

CMK Corporation Thailand Co., Ltd. primarily manufactures printed circuit boards for automobiles. Producing circuit boards requires the use of large amounts of water for cleaning, and the company uses more water than any manufacturing plant in the CMK Group, so reducing the amount of water it consumes has been an ongoing issue.

Kurita-GK Chemical Co., Ltd. proposed reducing water usage by raising the processing efficiency of the company's RO membrane facilities, which are the main piece of equipment used to manufacture water for cleaning. RO membranes filter out impurities and inorganic salts. After passing through the membranes, the water is used as industrial water, and water containing inorganic salts is processed as wastewater. When biofouling occurs on the surface of the membranes, it reduces permeated water volume, which increases the amount of water used. To address this problem, Kurita-GK Chemical applied water treatment chemicals that control biofouling on the RO membranes to successfully reduce water usage by 310,000 m<sup>3</sup> per year. In addition, the frequency at which the RO membranes are cleaned has been reduced from once per week to once every two months, and the frequency at which the cartridge filters, which are installed upstream from the RO membrane facilities, are replaced has been reduced from once per week to once every 1.5 months.



RO membrane facility

### Voice of the Customer

KURITA's RO chemical and consulting service provided us a great improvement in RO operation. We could operate RO system smoother and reduce total cost saving. Thank you, KURITA team, for their support.

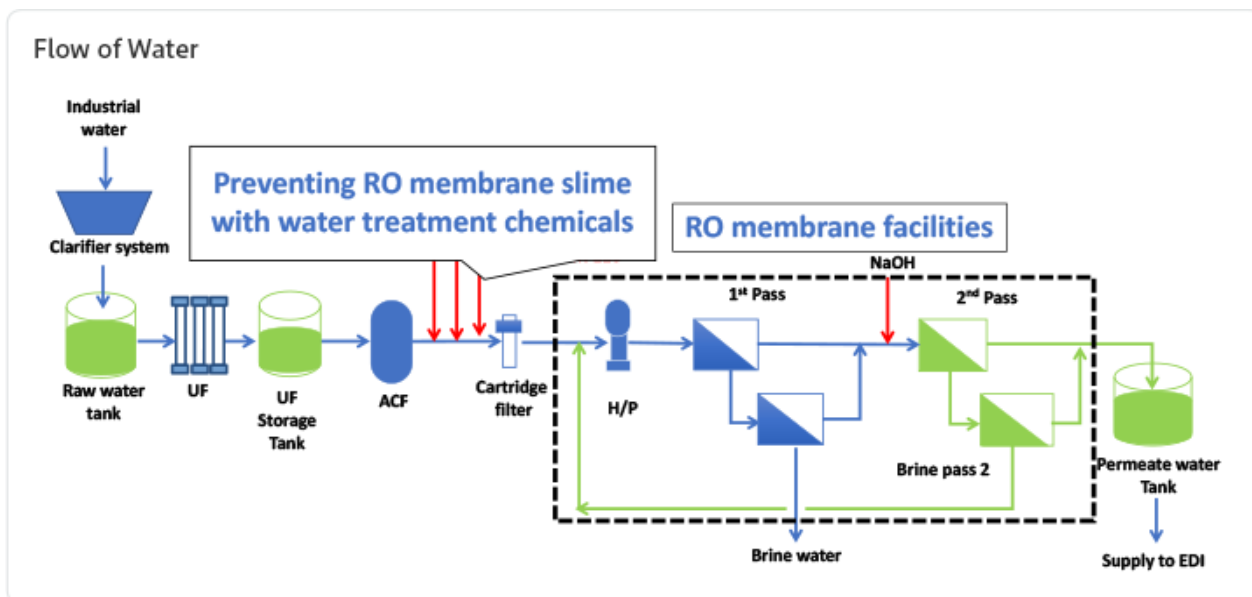


Mr. Wittaya Srisuwan  
Factory Engineering

## PTT Public (Rayong Gas Separation Plants): Environmental Improvement Case Study (Project of Kurita-GK Chemical)

PTT Public Company Limited is a petroleum and natural gas provider, the largest energy company in Thailand. The PTT Group promotes CSR activities based on the PTT Group SSHE (Security, Safety, Health and Environment) Management Standards with the goal of being an 'Advanced and Green National Oil Company.' The company's Rayong Gas Separation Plants had a problem with biofouling in its RO membrane facilities, which are used in water, reducing the amount of water passing through the membranes and requiring cleaning to maintain water volumes.

Kurita GK Chemical Co., Ltd. proposed using water treatment chemicals to prevent RO membrane biofouling. The proposal was adopted and resulted in stabilizing the amount of water passing through the membranes and also reduced membrane cleaning frequency from once every two months to once every four months, which served to reduce the amount of water used by 1,260 m<sup>3</sup> per year, including cleaning water. In addition, optimizing management of RO membrane facility operations and reducing the load on the water supply pumps caused by biofouling served to reduce electricity consumption by the equivalent of 11.5 tons-CO<sub>2</sub>.



### Voice of the Customer

In this case, Kurita's proposal can reduce water and energy consumption after CIP by Kurita's treatment program. RO can operate normally and have good condition. So, it can reduce a risk of membrane cracking. RO membrane can extend the operating time because of the performance as same as new membrane. I would like to thank Kurita for recommendation for saving cost. And we look forward to receiving more improvement proposal to cooperate together.



Mr. Thodsaphon Phansadsadee  
Process Engineering and Optimization Division,  
Production Planning and Technical Management Department

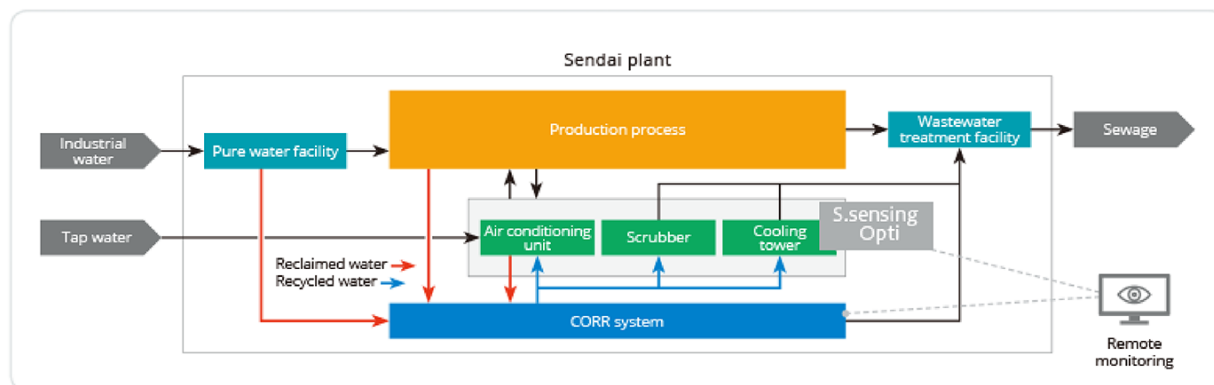
## Sendai Plant of Kanazawa Murata Manufacturing: Water Usage Reduction Case Study (Project of Kurita's Recycled Water Supply Service)

Reductions of **40%** in Tap Water Usage and **30%** in Sewage

At the electronic components manufacturer Kanazawa Murata Manufacturing Co., Ltd., an environmental initiative based on the Murata Manufacturing group's environmental action plan is under way. The Group has set a target for reducing water usage per production volume, and has set about reducing the volume of water used at its Sendai plant. Kurita Water Industries proposed a recycled water supply service that reclaims and recycles wastewater to help this customer achieve its goals. The service is a contract with the customer to supply recycled water, including operation and management of the CORR wastewater reclamation system. In applying this service, we cooperated with the customer to investigate the volume and quality of the reclaimable wastewater at each outlet, and to select areas for use of the recycled water depending on its quality. In this case, since the recycled water is used as make-up water for a cooling water system, we also provided cooling water quality management using the S.sensing™ Opti remote monitoring system.

Using the service has enabled the customer to use water in the plant more efficiently, and the customer expects to achieve reductions of 40% for tap water and 30% for sewage compared to fiscal 2018.

### Conceptual Diagram of Recycled Water Supply Service



### Voice of the Customer

Since introducing this service, we are delighted to have achieved the reductive effect on water usage as initially planned, as well as reducing labor for facility management. Furthermore, when we were at the stage of considering applications, various departments of Kurita Water Industries helped us to maximize the benefits of water usage reduction, demonstrating Kurita's powerful capabilities. We are now looking forward to receiving proposals for further reducing our environmental impact by expanding the scope of application and looking at management of water facilities throughout our entire plant.

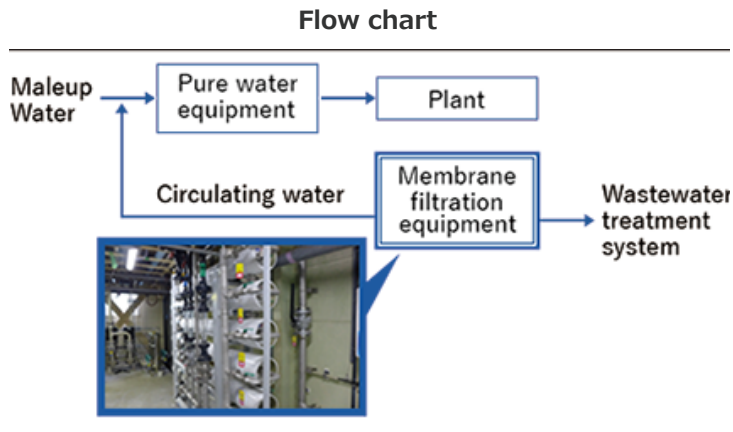


Mr. Etsuhiro Saito  
Administration SEC  
Sendai Plant

## SHINKO ELECTRIC INDUSTRIES Takaoka Plant: Water Saving Case Study (Project of Kurita Water Industries)

Annual water consumption Reduced by **25,000m<sup>3</sup>**

SHINKO ELECTRIC INDUSTRIES CO., LTD. mainly manufactures semiconductor packages that achieve the miniaturization and high functionalization of electronics products. The company positions environmental protection as one of its top management policies. To minimize water consumption at its plants, this customer collects and reuses as much water used for production as possible. However, the properties of the discharged water changed when the company modified the production volume and method in response to changes in its business environment. Consequently, it was becoming difficult to maintain a balance between the quality and quantity of water used at its plants. Kurita Water Industries proposed an improvement measure, with which water quality is improved by removing organic constituents, which were affecting the quality of pure water, by means of membrane treatment. The customer adopted our proposal. As a result, the amount of reusable circulating water increased, and it became possible to reduce the amount of makeup water, enabling water consumption to be reduced by 25,000m<sup>3</sup>/year.



### Voice of the Customer

We evaluate this proposal highly because it has enabled us to stabilize the quality of pure water and reduce the number of parts that are replaced due to the adhesion of dirt from organic constituents.

We expect Kurita to give us further proposals for reducing the environmental impact of our plants and ensuring stable operations.



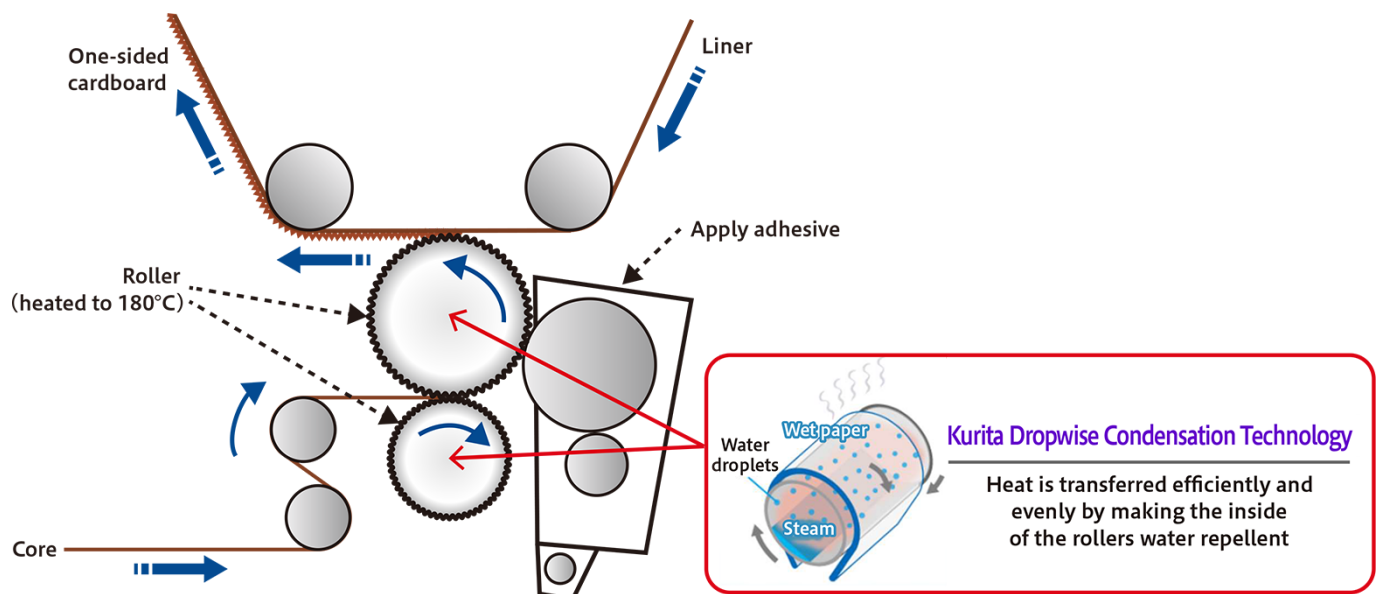
Mr. Takeshi Matsuki  
Manager of Facilities Management Department II ,  
Environmental Management Division

\*Position is as of fiscal 2018.

### Cardboard Manufacturing Plant: Environmental Improvement Case Study (Project by Kurita Kitakantou Co., Ltd.)

Corrugator units for manufacturing cardboard sheet are generally used at plants that manufacture cardboard products. These units press cardboard feedstock paper between metal rollers to produce a corrugated core, then adhere front and back liner sheets onto the core surface. To firmly fix the core to the liners with adhesive, it is heated by passing steam through the inside of the rollers. The challenge for reducing CO<sub>2</sub> emissions at cardboard manufacturing is therefore to reduce the amount of fuel used in the boilers that supply the steam.

Kurita Kitakantou Co., Ltd. proposed to its cardboard manufacturing plant customer the application of a technology to improve the thermal conductivity of the rollers by making the interior metal surface water repellent. When the steam condenses on the metal surface upon contacting it, a water film forms. Despite being very thin, this film can significantly reduce thermal conductivity, which causes more energy to be needed for stabilizing the heating temperature. The technology proposed by Kurita Kitakantou removes this water film. Applying this technology helped the customer to reduce their boiler fuel consumption by around 6%, and by applying the same technology at other plants, further fuel savings were achieved.



Process for adhering core and liners in a corrugator

## **Micron Memory Taiwan Co., Ltd.: Environmental Improvement Case Study (Project by Kurita (Taiwan) Co., Ltd.)**

Micron Memory Taiwan Co., Ltd. is a semiconductor component manufacturer in the Micron Technology Group. It mainly supplies DRAM devices and other electronic parts, as well as related technology solutions. The company is working to reduce its environmental impact and improve worksite safety, while also responding to customer demands for lower CO<sub>2</sub> emissions and better energy efficiency through wider use of renewable energy. As part of efforts to achieve its environmental goals, Micron Memory Taiwan wanted to reduce the large amount of electricity used by its system for decomposing total organic carbon (TOC), one of the processes in its ultrapure water production system. Kurita (Taiwan) proposed replacing the ultraviolet (UV) lamps in the TOC decomposing system with highly efficient models. Ultrapure water production systems cannot be shut down for long periods, as this leads to a buildup in contaminants in equipment and piping. The upgrade work was therefore completed while the system was still in operation, with Kurita (Taiwan) retaining the existing UV lamp vessels but upgrading lamps and internal structures one by one with more efficient models. As a result, Micron Memory Taiwan was able to cut electricity consumption by 375,804 kWh per year, reducing annual CO<sub>2</sub> emissions by 173 tons.

### **Voice of the Customer**

The project achieved its original goal of improving energy efficiency, but we also avoided a shutdown of the ultrapure water production system, which would have impacted fab productivity. We are happy to report that Kurita (Taiwan) met and exceeded our expectations, helping to increase the stability of the UV system, save energy, and improve system control and operation, thanks to its rapid project execution and technical capabilities.

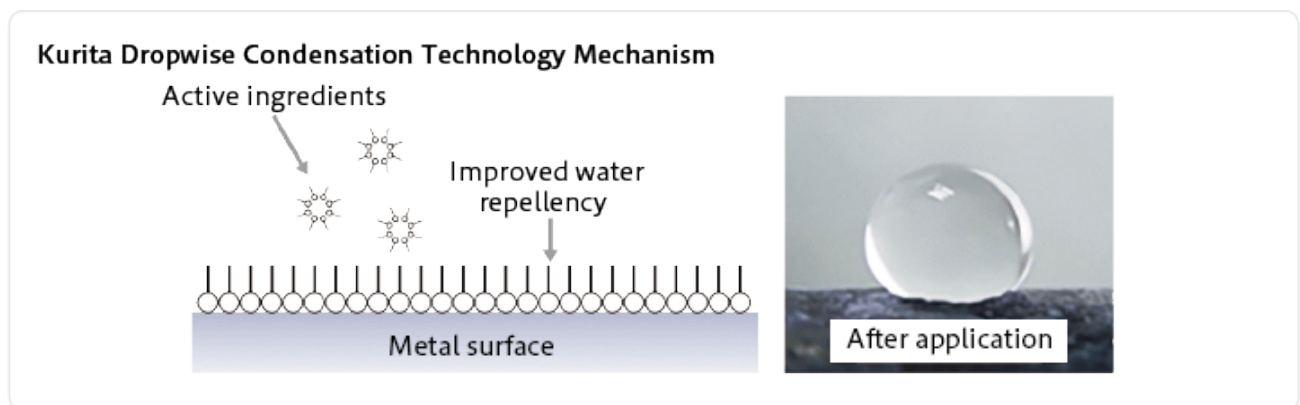
## **Pražské Služby: Environmental Improvement Case Study (Project by Kurita Europe GmbH)**

Pražské Služby is responsible for providing municipal waste management services in Prague, the capital of the Czech Republic. Pražské Služby operates a waste incinerator where waste from the capital and its surrounding suburbs is used as fuel for power generation in the waste-to-energy process. Boiler water treatment is needed for safe operation of the boiler facility, and the company was using a conventional treatment chemical that used phosphates. The ion concentration in the boiler water needs to be kept within a certain standard value, and to prevent the ion concentration from increasing due to the phosphates, the company continuously drained a portion of the boiler water and replaced it with new water. Kurita Europe GmbH proposed Cetamine, a treatment chemical that does not significantly increase ion concentration as it does not use phosphates. With the adoption of this proposal, overall water quality has significantly improved and blow-down has been optimized and reduced by 50%. Thanks to this system optimization, Pražské Služby has cut annual water consumption by more than 6,000 m<sup>3</sup> and saved more than 1,500 MWh of energy, reducing CO<sub>2</sub> emissions by 450 tons.

## Thai United Awa Paper: Environmental Improvement Case Study (Initiative of Kurita-GK Chemical)

The main business of Thai United Awa Paper Co., Ltd. is the manufacture and sale of filter paper for automotive engines and separator base paper for storage batteries. As a member of the Awa Paper Group, the company is working to reduce its environmental impact based on the Group's environmental policy. An ongoing issue in particular has been reducing energy usage in the paper manufacturing process.

Kurita-GK Chemical Co., Ltd. proposed to reduce the volume of steam consumed by incorporating Kurita Dropwise Condensation Technology into the dryer used in the drying process. This technology improves thermal conductivity by making metal surfaces water repellent. In the drying process, wet paper is dried by being brought into contact with a steam-heated metal dryer. Steam condensation causes a film of water to form on the surface on the steam side of the dryer. This film lowers thermal conductivity significantly. This was causing more steam to be needed to heat the dryer to appropriate temperatures. By adopting Kurita-GK Chemical's proposal to eliminate the water film, the customer reduced the amount of steam used by 12%-25% per paper production volume.



\* Kurita Dropwise Condensation Technology won the Agency of Natural Resources and Energy Director-General's Award in the Product and Business Model category of the 2019 Energy Conservation Grand Prize, organized by The Energy Conservation Center, Japan.

### Voice of the Customer

This proposal achieved a far greater impact than we imagined, and the volume of steam used was reduced significantly. Continuing to use this technique will also help control corrosion, so we expect that it will also be effective in lowering maintenance costs.

We look forward to ongoing proposals and cooperation as we seek to further reduce costs and environmental impact in our operations.



Mr. Takafumi Tomai  
Factory Manager  
Thai United Awa Paper Co., Ltd.

## **CELUPA INDUSTRIAL CELULOSE E PAPEL GUAÍBA: Environmental Improvement Case Study (Project of Kurita do Brasil)**

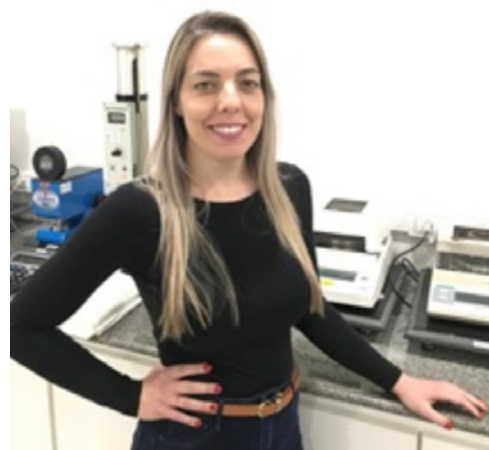
CELUPA INDUSTRIAL CELULOSE E PAPEL GUAÍBA LTDA. manufactures various types of specialty papers for sterilization processes, food packaging and the production of coffee filters. The papermaking process requires the use of steam, so one challenge at the company is reducing the amount of fuel used for steam generation, thus reducing CO<sub>2</sub> emission as well.

Kurita do Brasil LTDA. proposed the use of a new technology "KURITA PJ" for raising thermal conductivity by water-proofing the metal surface of the paper drying drums that are heated by steam. A layer of water is formed inside the drying drums when steam condenses on the metal surface in contact with the steam. Even when extremely thin, this water membrane greatly reduces heat conductivity, which causes more energy to be consumed in the papermaking process. Kurita do Brasil proposed a technology to eliminate this water membrane. Treating the steam with a water-proofing chemical successfully reduced the amount of heat needed, which in turn reduced the fuel consumption per ton of paper produced by 2.8%.

### **Voice of the Customer**

Application of PJ Technology has been advantageous for our process. In addition to the reduction in steam consumption, we achieved environmental gains by reducing the carbon footprint and consumption of fresh water to produce the steam.

With Kurita PJ the process works in stability and brings important gains for CELUPA.



Ms. Natalie Figueiredo da Silva  
Quality Control

## Fuji Clean: Energy Creation Case Study

Reducing annual CO<sub>2</sub> emissions by **10,000 t**

Fuji Clean Co., Ltd.'s businesses range from collection and transportation of waste to intermediate treatment\* and final disposal in landfill. It contributes to society through safe treatment of waste. Fuji Clean developed a concept of creating renewable energy by methane fermentation of waste, and contributing to the local community that provides the waste by supplying electric power and heat during disasters. Since the areas surrounding the company's facilities and the area downstream are prospering agricultural areas, the company needed a treatment that did not produce wastewater, and was seeking for a partner with suitable technologies. Kurita Water Industries proposed production of biogas from waste using the dry methane fermentation technology that it has developed over many years. This methane fermentation technology is able to treat waste such as paper waste, which has a high organic matter content and low water content, and does not produce wastewater. Since it met Fuji Clean's requirements, the proposal was accepted. Moreover, through this proposal, Fuji Clean's project was selected as the Demonstration Project for Regional Autonomous Biomass Energy System by the New Energy and Industrial Technology Development Organization (NEDO), and is currently being trialed. Furthermore, the biogas generated by the dry methane fermentation reactor is used as fuel for an onsite boiler and power generator, reducing the use of electricity and fossil fuels, and attendant CO<sub>2</sub> emissions.

\* Intermediate treatment: Minimizing the volume of waste for landfill by separating it and then crushing or incinerating it.

### Voice of the Customer

We decided to adopt Kurita Water Industries' dry methane fermentation technology because it was suitable not only for our vision, but also for the condition of the waste that we receive. Since the types and volume of waste change day by day, we encountered some difficulty in setting up a dry methane fermentation reactor, but we were glad have Kurita alongside us as we strove to establish a method for operation and management. We hope to receive further input from Kurita on biogas generation, as well as cooperation on our social contribution activities.

### Dry methane fermentation reactor



Mr. Hisato Kinjo  
General Manager, Renewable Energy Department  
Dry Methane Fermentation Plant

### Die Cast Products Plant: Environmental Improvement Case Study (Project by Kurita Water Industries (Dalian) Co., Ltd.)

A customer that manufactures processed aluminum products in China is working to reduce its environmental impact at every stage of the product lifecycle in accordance with its environmental policy. Among these environmental impacts, the customer is continuously working to reduce industrial waste and increase recycling by thoroughly implementing waste separation.

Kurita Water Industries (Dalian) Co., Ltd. proposed a approach for reducing industrial waste by lowering the amount of water treatment chemicals used in a wastewater treatment facility to reduce waste originating from the reaction of water treatment chemicals and impurities in the wastewater. The wastewater treatment facility uses a range of water treatment chemicals such as flocculants to render wastewater non-hazardous. The treatment status of the wastewater is constantly monitored by sensors and the quantity of chemical additives used for its treatment and stabilization is optimized by automatic control to enable waste to be reduced. By adopting this proposal, the customers waste was reduced to around one tenth of the previous amount. Furthermore, the reduction in waste also enabled a reduction in the frequency of operation of dehydration equipment, while automatic control enabled stabilization of the wastewater treatment and power saving.

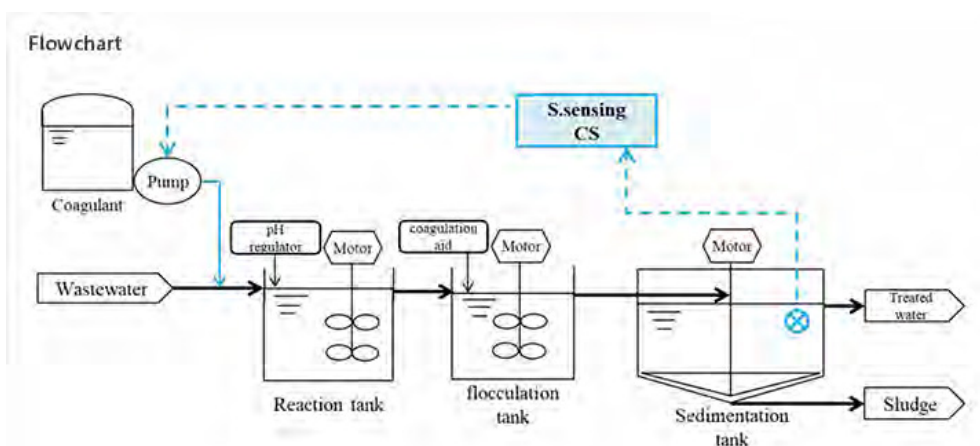


Automatic control system for water treatment chemicals

## Japan Display: Environmental Improvement Case Study

The main businesses of Japan Display Inc. range from R&D to manufacturing and sales of various devices such as displays and sensors. As a participant in the United Nations Global Compact, the company has set green tech and sustainability management as part of the basic policies in its growth strategy leading up to 2026. The Mobara plant, Japan Display's development and manufacturing site, has set reduction targets in various categories, including waste emissions, and the thorough management, reduction, and substitution of chemical substances, and is pursuing ongoing environmental activities to achieve these targets.

Kurita Water Industries Ltd. engages in the production and supply of ultrapure water used in production facilities at Japan Display's Mobara plant as well as in the recovery and treatment of wastewater from the plant. As part of Japan Display's environmental improvement activities, Kurita Water Industries has been working with the customer to detoxify wastewater generated in the production process. Wastewater treatment facilities use various water treatment chemicals to detoxify wastewater. The challenge was to reduce the large amount of industrial waste produced by chemical reactions. To address this issue, Kurita Water Industries developed a proposal to constantly monitor wastewater treatment status using S.sensing CS technology. This makes it possible to optimize the amount of chemical additives used to detoxify and stabilize wastewater. This measure is expected to reduce both the volume of chemicals used and the volume of chemically derived waste by 55% compared to previous treatment methods. Going forward, Kurita Water Industries plans to deploy a similar approach to other wastewater treatment systems to further reduce environmental impact.



### Voice of the Customer

With raw material prices soaring worldwide, the mechanism to reduce the use of water treatment chemicals and the discharge of industrial waste was an excellent proposal that had a direct and positive impact on sustainability.

We look forward to continue working with Kurita on improving the operational stability of our water treatment facilities and reducing environmental impact, as the system also improves wastewater discharge monitoring and has the potential to be deployed at other facilities.



Mr. Hiroshi Nagao  
Senior Manager, Facility Section,  
Total Cost of Ownership Innovation Department,  
JDI Manufacturing Campus, InfiniTech Business Unit,  
Japan Display Inc.

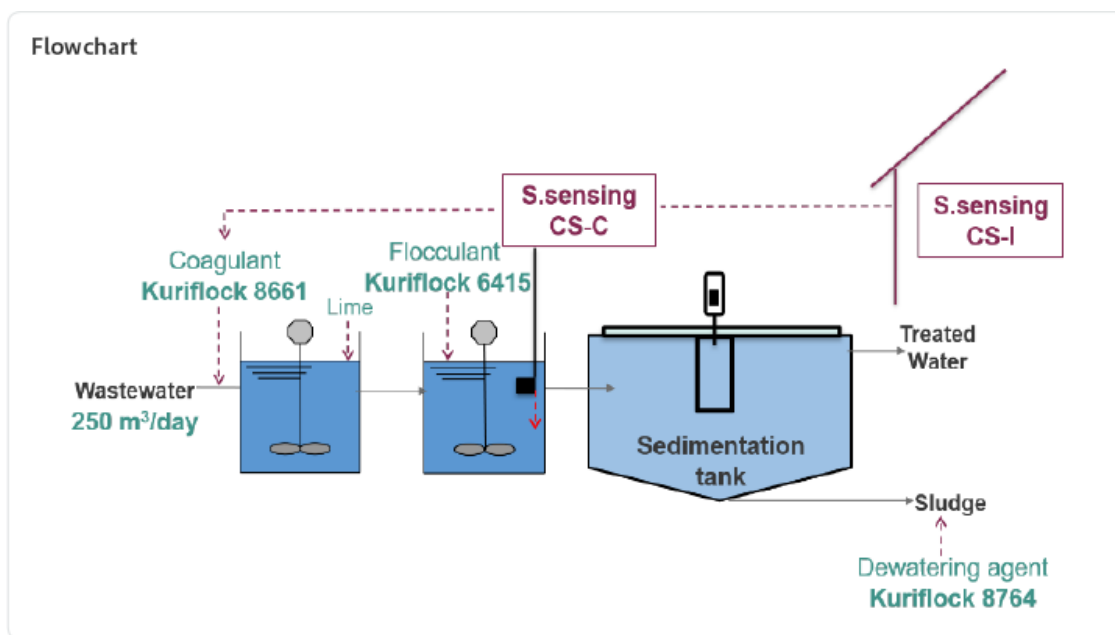
## Starwood Forest Products: Environmental Improvement Case Study (Project by Kurita Europe)

Starwood Forest Products AS is a wood processing company headquartered in Turkey. Its main products are wood board and impregnated paper\*. Guided by its motto "Infinite Respect to the Environment," Starwood has gained ISO 50001 Energy Management System and ISO 14001 Environmental Management System certification and is working to improve environmental performance. The company has also installed electrostatic filters to remove dust from the air in its facilities as part of its emphasis on employee working conditions and the environment.

To reduce industrial waste, Starwood incinerates sludge generated by its wastewater treatment facilities. However, the customer wanted to cut the volume of sludge in order to further reduce industrial waste and minimize energy used in the incineration process. A large amount of the sludge originates from water treatment chemicals (coagulants and flocculants) that is added to the wastewater as part of the treatment process. To address that issue, Kurita Europe GmbH (KEG) developed a proposal to monitor flocculant levels in real time using laser-based S.sensing CS technology. KEG also offered its Kuriflock water treatment chemicals as part of the package. The system optimizes chemical dosage levels and monitors water discharge quality while also reducing the volume of sludge.

After adopting the proposal, Starwood was able to cut coagulant usage by 20% and reduce industrial waste by around 21 tons per year. The system also automatically adjusts flocculant treatment in response to wastewater quality, helping to stabilize wastewater treatment and reduce manpower needed for system operation.

\* Paper impregnated with resin.



### Voice of the Customer

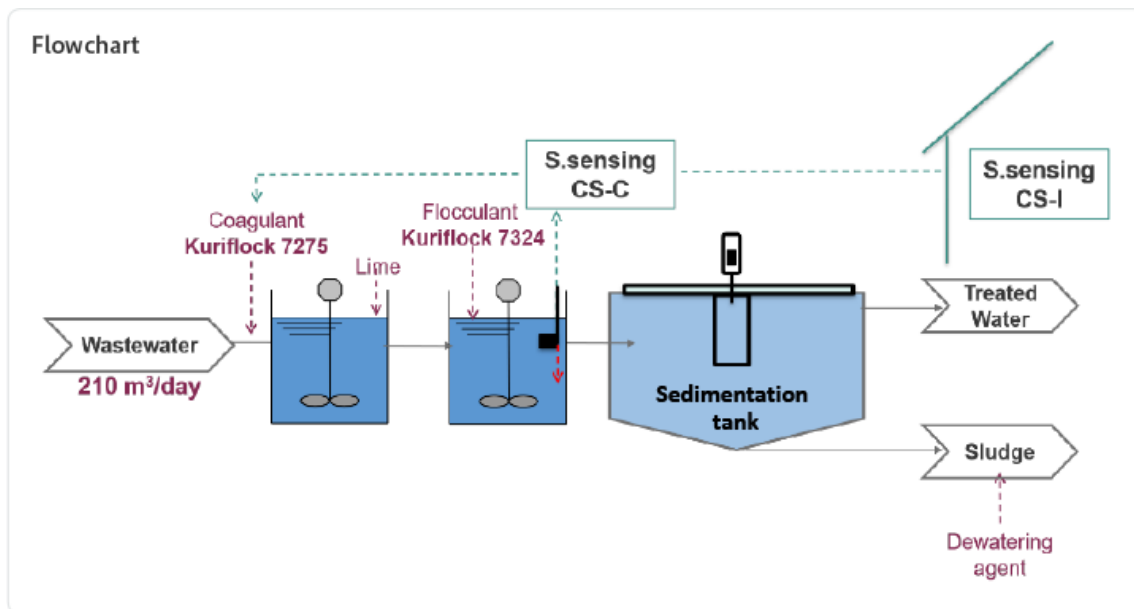
The online monitoring and control of the wastewater treatment facilities proposed by KEG allowed us to significantly reduce both the amount of coagulant additives and the amount of sludge derived from the coagulant. The system also operates smoothly and properly in pH conditions ranging widely from 6 to 9, and has yielded an improvement in effluent quality, including a 15% reduction in chemical oxygen demand. In addition, since manual control is no longer necessary, manpower needed for system operation at the wastewater treatment facilities has been shortened, while the sludge water content has decreased, resulting in smoother dehydration and incineration processes. (Mr. Yusuf Uzunoğlu)

## Nissan Zona Franca Factory (Barcelona): Environmental Improvement Case Study (Project by Kurita Europe)

The Nissan Zona Franca Factory (Barcelona) is one of the Nissan Group's European production sites. Based on its ISO 14001 environmental certification, the factory carries out environmental improvement activities that involve the whole workforce. To achieve Nissan's environmental goals, employees at the factory receive pocket-size booklets with a checklist of environmental best practices and undergo rigorous environmental training.

Like other automakers in Europe, Nissan's wastewater treatment processes involve hand samplings, laboratory analyses, and visual control of discharge, as well as higher-than-needed "just-in-case" additives of water treatment chemicals (coagulants and flocculants). This approach has led to an increase in the volume of sludge derived from such chemicals as well as unstable wastewater treatment.

To tackle those issues, Kurita Europe GmbH (KEG) developed a proposal to appropriately monitor and control wastewater treatment facilities online using its S.sensing CS technology. After adopting the proposal, the factory was able to reduce manpower in wastewater treatment facility operations and stabilize water quality. The system also reduced coagulant volume by 30% through optimized product control and cut industrial waste by around 21 tons annually.



## Voice of the Customer



Mr. Jorge Jiménez



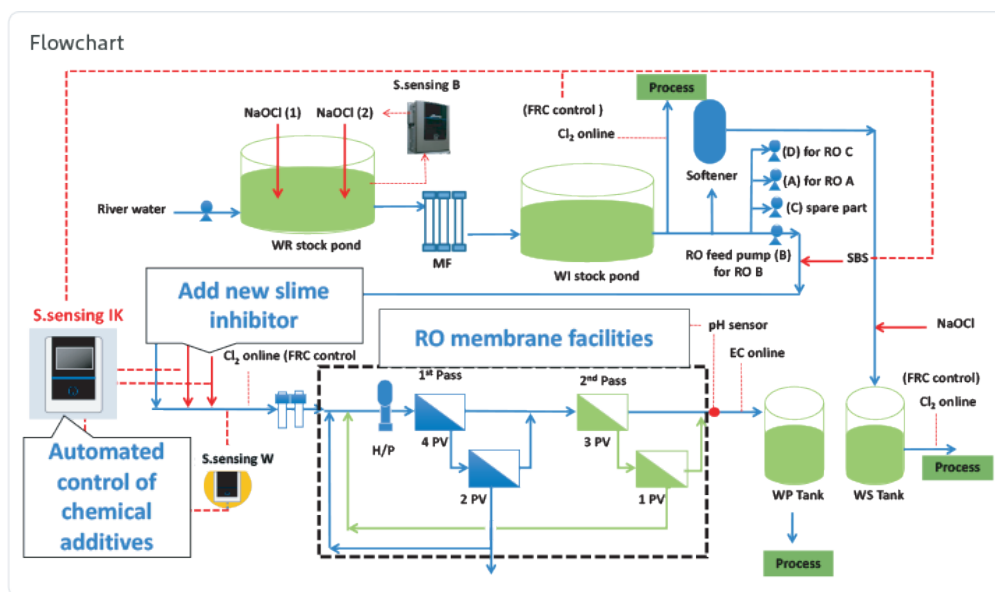
This project received a letter of reference from the customer.

## Ajinomoto (Thailand) (Ayutthaya Plant): Environmental Improvement Case Study (Project of Kurita-GK Chemical)

Ajinomoto Co., (Thailand) Ltd. (Ayutthaya Plant) in Thailand primarily produces umami seasonings. The company is a member of the Ajinomoto Group and as such works to reduce greenhouse gases and plastic waste. To reduce the environmental impact of RO membrane facilities that are used to manufacture industrial water at the plant, Kurita-GK Chemical Co., Ltd. proposed lengthening the operational life of the RO membranes to reduce waste and electricity consumption.

RO membranes can collect biofouling\* and other substances on their surface, making it difficult for water to pass through. This increases the load on the pumps used to supply water to the membranes and increases electricity consumption as a result. Moreover, to maintain water production volumes, the RO membranes have to be cleaned and replaced regularly. The solution proposed by Kurita-GK Chemical applies new water treatment chemicals that inhibit biofouling and uses sensors to optimize the levels of chemical additives needed for stable membrane operations. After the solution was adopted by the plant, cleaning frequency decreased, RO membrane waste declined 0.4 tons per year and electricity consumption dropped by the equivalent of 8.5 tons-CO<sub>2</sub>. The amount of cleaning agents and wastewater from membrane cleaning also decreased. In addition, sensor-based control has made it possible to reduce the amount of chemical additives as well.

\* Pollutants formed by microorganisms such as bacteria and algae in water.



### Voice of the Customer

S.sensing and IK from KURITA can control the amount of chemicals use in the RO system very well and save maintenance cost of membrane RO.



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# Precision Equipment Manufacturing Plant: Waste Reduction Case Study

## Reducing Waste Arising from Chemicals

At the plant of a customer who manufactures precision equipment in Thailand, wastewater from the manufacturing process is purified by coagulating suspended solids from the dicing process and so forth in a wastewater treatment facility. The coagulation process separates out matter suspended in the water by solidifying it into a mass using chemicals. The chemicals used are formed into a solid mass along with the suspended solids, and emitted as final waste product. Reducing the waste product at the plant was therefore a matter of reducing the amount of chemicals used.

Kurita-GK Chemical Co., Ltd. proposed using the water treatment chemical KURITA ZA to promote the coagulation effect of the chemicals used at the plant, and the introduction of the S.sensing CS-C sensor to confirm the coagulation status in real-time, allowing optimization of the amount of chemicals used. After implementing this proposal, the customer achieved a reduction of more than 80% in the amount of chemical usage, which led to an attendant reduction in the amount of chemical originated waste. Furthermore, since the coagulation status is now able to be grasped using the sensor, the customer is also able to reduce the amount of labor used in management.

Image of Wastewater Treatment Process and Proposal Details

