



RO CHEMICAL KURIVERTER[®]

RO Chemical / KURIVERTER[®] SERIES

For troubles of RO
KURITA, Water Treatment Specialist, Solution Provider



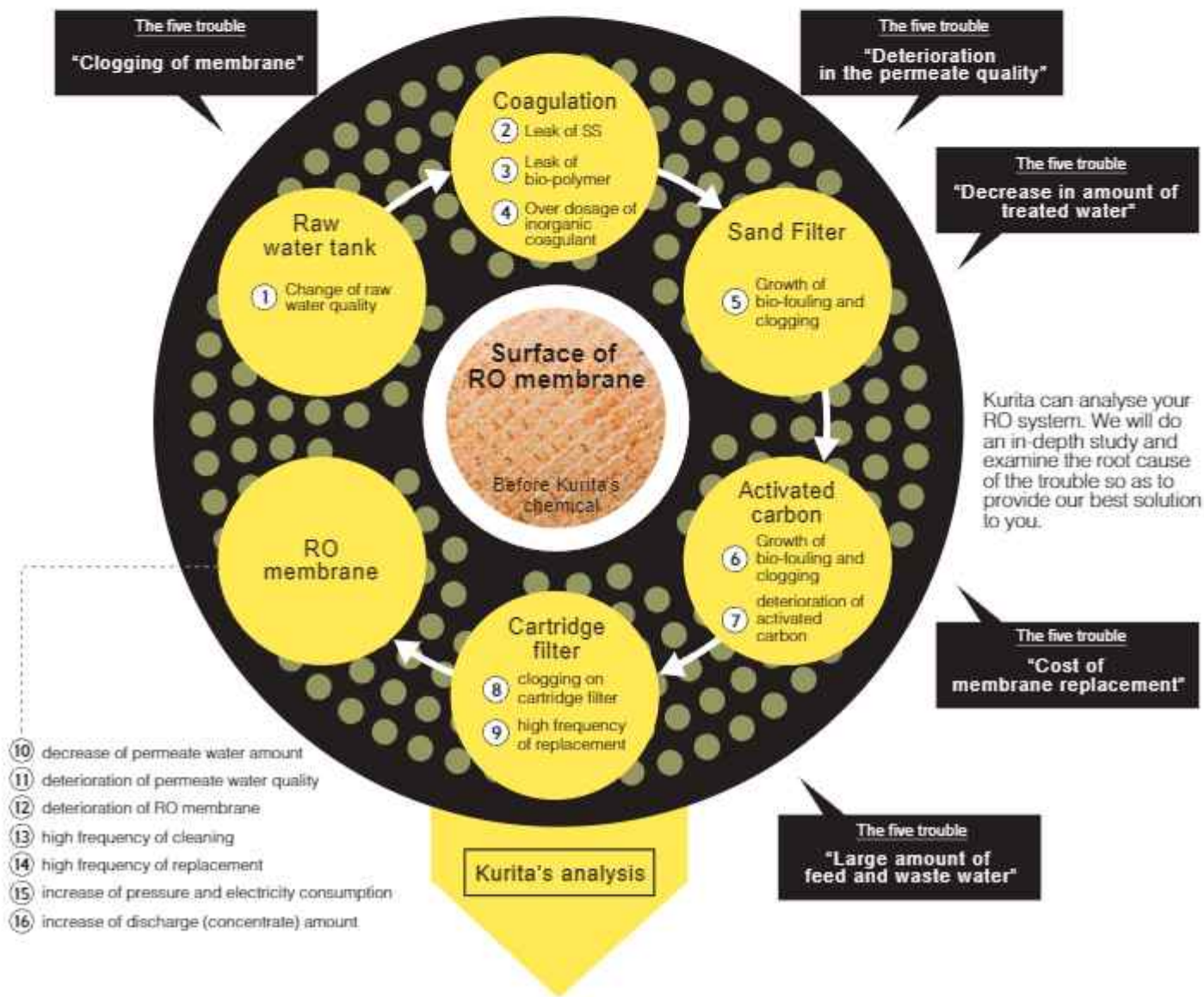
Total solution the "KURIVERTER® SERIES" provides remarkable solutions for various troubles with RO treatment process.

The 5 common issues with RO membrane are "membrane clogging", "deterioration in the permeate water quality", "reduction in the amount of treated water", "high cost for membrane replacement" and "high feed water consumption and high waste water generation". Leave them to Kurita. We have the COMPLETE line up of RO treatment chemicals for all RO processes. KURIVERTER® SERIES of chemicals includes slime control agent, anti-scalant, pre-treatment agent and cleaning chemicals for RO membrane. Not only will it eradicate the cause of trouble, it will also enhance the performance of the RO system, resulting in better yield for your company. Kurita, the professional of water treatment, always have a solution for you.



BEFORE KURITA [Example of troubles]

Do you face such issues?



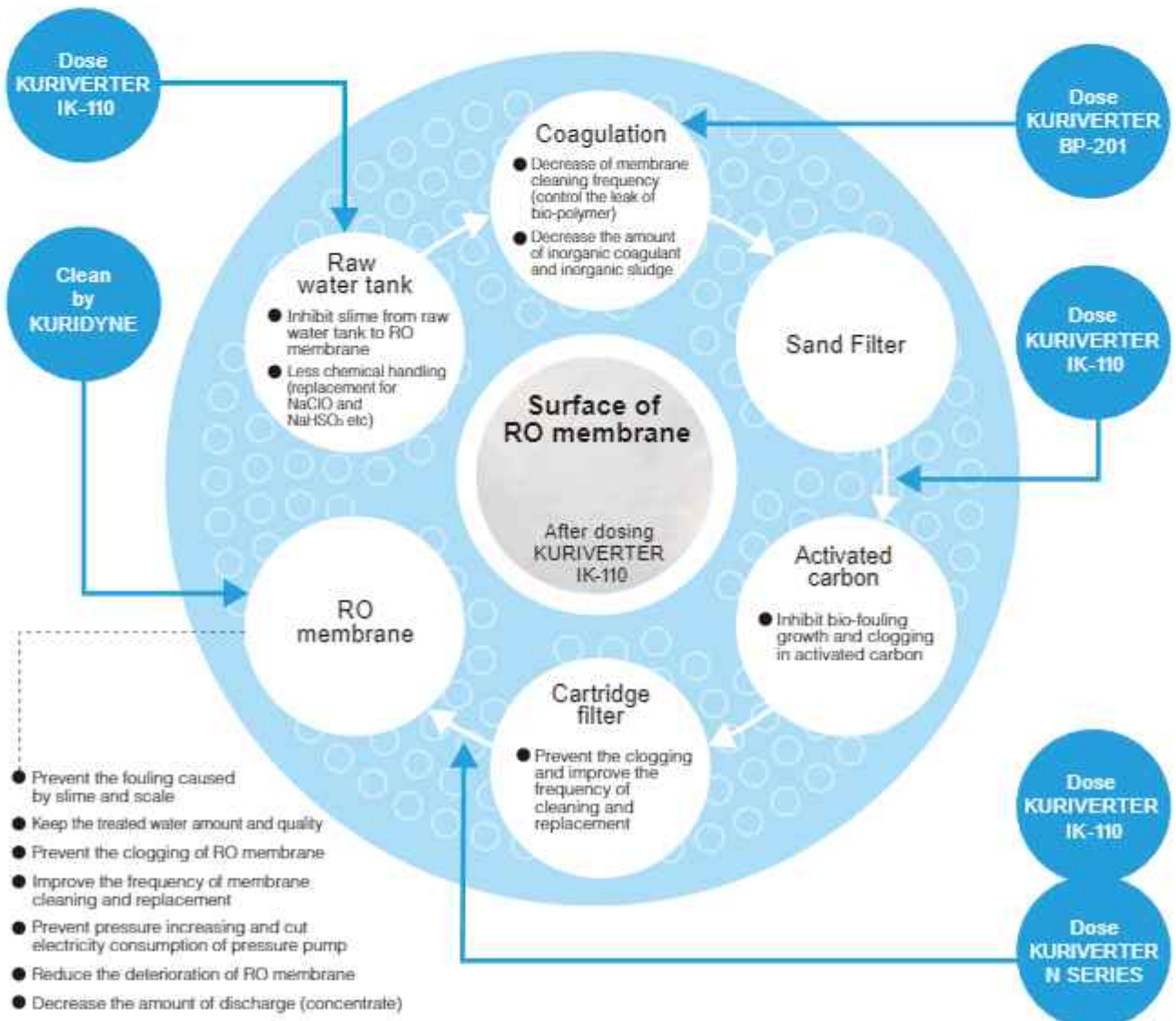
Reduction in electricity consumption of high pressure pump, frequency of cleaning & replacement of RO membrane and reduction in feed water consumption and waste water generation. Kurita can provide a TOTAL OPERATION COST DOWN.



*Figures quoted above is based on an actual case study. Result may varies depending on actual condition of the system.

AFTER KURITA [Example of solution for troubles]

KURIVERTER® SERIES is the answer to these issues/problem.



KURIVERTER® IK-110

Slime control agent KURIVERTER® IK-110



Excellent Slime Control effect for Raw Water Tank and Activated Carbon!

In the case of dosing at raw water tank, KURIVERTER IK-110 can prevent slime growth from the upstream of raw water tank to the RO membrane. In RO system that consists of activated carbon at the pre-treatment stage, microbe may breed and grow in the activated carbon columns. This may eventually resulted in biofouling trouble at the latter stage of the processes such as the cartridge filters and RO membranes. With KURIVERTER IK-110, the potential source of microbe growth at the activated columns is brought under control. Furthermore, KURIVERTER IK-110 can be applied in combination with conventional organic biocide for high bio-growth potential or heavily fouled systems. Ultimately, KURIVERTER IK-110 with extremely low oxidizing potential will have no adverse effects to the RO membrane!

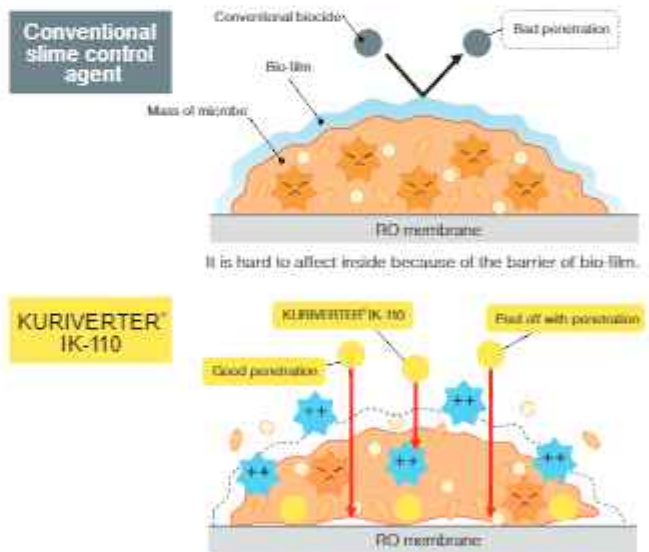
*KURIVERTER IK-110 is absorbed at activated carbon.
Redosing of IK-110 after activated carbon can be needed.

Troubleshooting

5 Growth of bio-fouling and clogging	11 deterioration of permeate water quality
6 Growth of bio-fouling and clogging	12 deterioration of RO membrane
7 deterioration of activated carbon	13 high frequency of cleaning
8 clogging on cartridge filter	14 high frequency of replacement
9 high frequency of replacement	15 increase of pressure and electricity consumption
10 decrease of permeate water	16 increase of discharge (concentrate) amount

The world first NSF® certified online slime control agent.

Conventionally, to remove the slime on RO membrane, it has been necessary to stop the plant operation and soak RO membrane in chemical. Slime control agent KURIVERTER IK-110 is totally different from conventional disinfection chemicals. This is a totally new type of slime control agent which peels off the slime on RO membrane just by dosing. Therefore you do not need to stop operation of RO plant. Continuous operation and prevention of biofouling can be realized. Stable operation and reduce the operation cost can be achieved by IK-110. Since this is not disinfection treatment, KURIVERTER IK-110 is a higher safety chemical compared to conventional slime control agent.

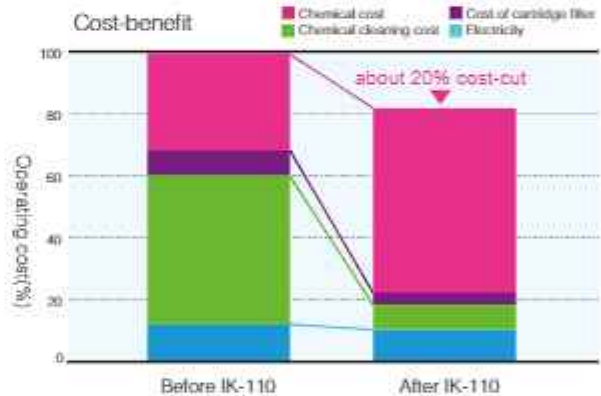
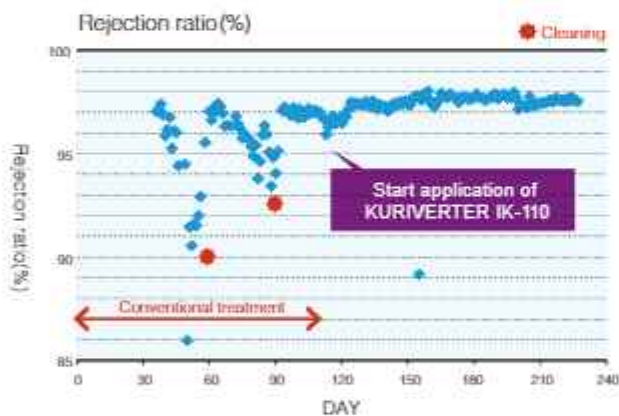
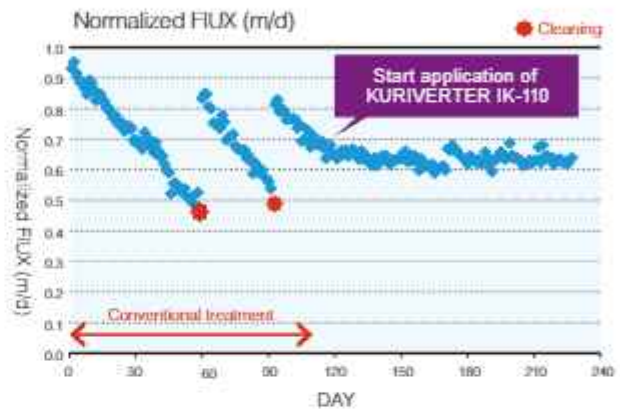
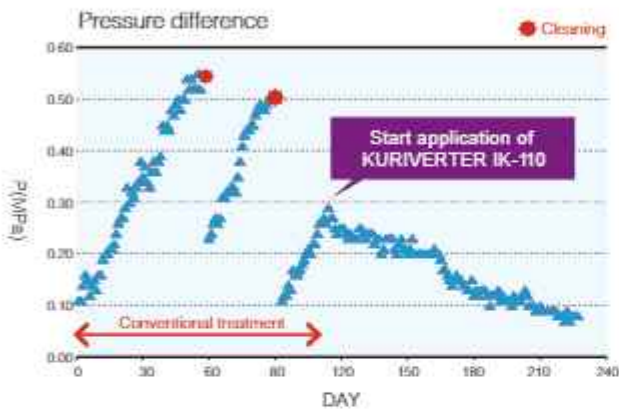


KURIVERTER® IK-110

Slime control agent KURIVERTER® IK-110



Case Study of KURIVERTER® IK-110 application in a RO plant [Semiconductor A company : Ultra-pure water plant]



KURIVERTER® IK-110 can reduce cleaning frequency to one-sixth of RO system with high biofouling potential. Savings of 22-50% can also be observed from the reduction in cartridge filters replacement frequency, depending on the biofouling potential of the RO system.

There had been a problem with high frequency of membrane cleaning caused by clogging of bio-fouling. Application of IK-110 could make a major breakthrough in these problems by preventing the clogging of RO membrane due to bio-fouling. Pressure difference was improved to fall below a level which is just after cleaning. Electricity cost was also reduced. Moreover, amount of treated water was stabilized and rejection ratio was recovered up to the new membrane level. Consequently, the frequency of membrane cleaning can be reduced to one-sixth, the cost of cartridge filter replacement by half and total cost by 22%.

KURIVERTER® N SERIES

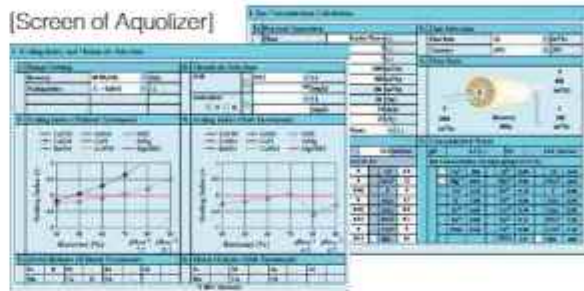
Anti-scalant "KURIVERTER® N SERIES"



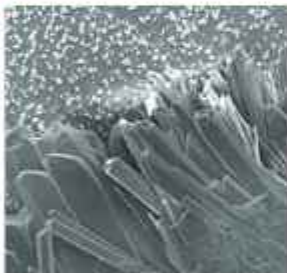
Anti-scalant simulator "Aqualizer". Make the right choice!

While we refer to them all as scale, there are a large variety of causative substances. The most appropriate and ideal anti-scalant must be carefully chosen to handle each of them. "Aqualizer", a Kurita proprietary anti-scalant simulation software, can identify the potential scale substances which may cause trouble on the RO membrane. It can also select the most appropriate anti-scalant to be applied.

[Screen of Aqualizer]



Micrograph of Scale



CaSO₄ scale



BaSO₄ scale

Troubleshooting

⑩ decrease of permeate water	⑭ high frequency of replacement
⑪ deterioration of treated water quality	⑮ increase of pressure and electricity consumption
⑬ high frequency of replacement of cleaning	⑯ increase of discharge (concentrate) amount

KURIDYNE® M SERIES

Cleaning chemicals "KURIDYNE® M SERIES"



KURIDYNE M SERIES Cleaning chemical, the remedy / solution to recover and clean up fouled RO system.

The causes of fouling on the RO membrane varies from particles, microbe, organic compound to inorganic compound deposition. KURIDYNE M SERIES, an effective cleaning chemicals, is critical to clean up and remove foulants from the RO membrane. NSF certified or GRAS (generally recognized as safe) cleaning chemicals is available for drinking water and other applications.

Troubleshooting

⑩ decrease of permeate water	⑬ high frequency of cleaning	⑯ increase of discharge (concentrate) amount
⑪ deterioration of treated water quality	⑭ high frequency of replacement	
⑫ deterioration of RO membrane	⑮ increase of pressure and charge for electricity	

KURIVERTER® BP-201

Pretreatment coagulant "KURIVERTER® BP-201"



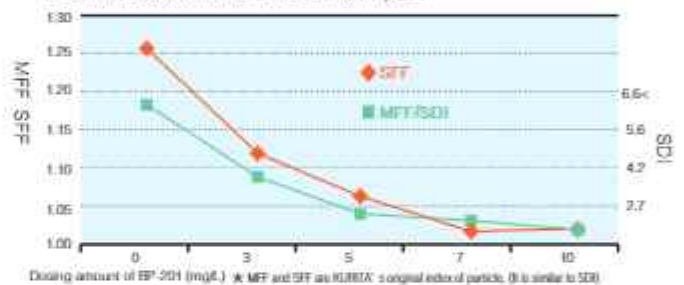
KURIVERTER® BP-201 remove the contaminants not removed by inorganic coagulant.

Hence, improving the pre-treatment of the RO system.

At the pre-treatment process of RO plant, coagulation is usually carried out to remove the contaminant from the raw water. Inorganic coagulant such as PAC or Ferric Chloride is usually applied. However, inorganic coagulant is not always the perfect solution and hence contaminants like biopolymer may not be removed. KURIVERTER BP-201 reacts well with biopolymer and effectively remove them from the raw water. The end result is an improved pre-treatment which will reduce RO membrane fouling / clogging. As such, cleaning frequency will be reduced and hence a stable operation. Furthermore, by optimizing / reducing the amount of inorganic coagulant dosed, inorganic sludge volume will also be reduced. Thus, cost saving from sludge or waste disposal will be observed.



Relation between BP-201 and MFF, SFF



Troubleshooting

- | | |
|--------------------------------------|--|
| ① Change of raw water quality | ⑩ decrease of permeate water |
| ② Leak of SS | ⑪ deterioration of permeate quality |
| ③ Leak of bio-polymer | ⑬ high frequency of cleaning |
| ④ Over dosage of inorganic coagulant | ⑭ high frequency of replacement |
| ⑧ clogging on cartridge filter | ⑮ increase of pressure and electricity consumption |
| ⑨ high frequency of replacement | ⑯ increase of discharge (concentrate) amount |

KURITA, the expert of RO proposes the best treatment

Try! KURITA's RO analysis.

Field research

Clear up the troubles by field research and water quality research.

Analysis of plant

Performance test of RO membrane and analysis of fouling.

Proposal for the best treatment

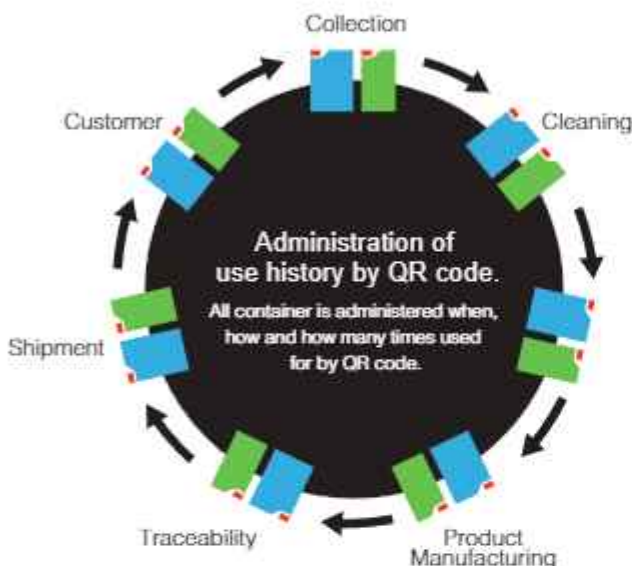
Propose the appropriate combination of KURIVERTER SERIES depends on the customer's plant and water quality.



ECO SHUTTLE

Eco-friendly and budget-pleasing "ECO SHUTTLE", the returnable container collection system.

KURITA originally had developed the returnable container collection system as part of measures of ISO14001. KURITA has developed a returnable container for chemicals and created a distribution system where in these containers are collected and returned. This not only assists contribution to environmental conservation including reducing CO2 emission, it also reduce our customer's cost of industrial waste.



Throughgoing cleaning in every detail

Kurita collects used polystyrene tanks from customers and cleans them by exclusive automatic washer after classified into its dirt conditions of tanks.



Reuse detailed examination passed container only

After cleaning, we examine these container at three stages and reuse them only satisfy the criteria.



Reclaim plastic products from waste containers

These containers for waste including expired and not suitable for reuse are reclaimed to various plastic products.



Reduce the wastes besides polystyrene container

We also contribute to reduction of wastes through directly delivery liquid chemicals by tanker truck, and reusing stainless steel containers.

The KURITA Group is an Advanced Water and Environmental Management Company to contribute to society by striving to add new value and functions to water and by meeting global challenges such as the conservation of the natural environment and effective use of resources.

Water Treatment Chemicals Services

Our water treatment chemicals services are designed to maintain and improve the production efficiency of manufacturing processes in a variety of industries. In addition, we realize efficient reclamation and recycling of water.

Outsourcing Services

Kurita ensures smooth, stable operations through our proactive approach to troubleshooting and rapid response to emergencies. We help to maintain stable business operations through years of accumulated technology and know-how.

Soil and Groudwater Remediation

One of a critical issue for modern society is soil and groundwater contamination. Utilizing the know-how we have accumulated as water specialists, we provide beginning to end services covering everything from contamination assessment to remediation. We even provide proposals for sale or redevelopment of land that has been restored to a safe condition.

Ultrapure Water Supply Services

Kurita developed a new business model for installing ultrapure water production systems within customer's factories and provides a total package of services to operate, manage, and maintain the facilities.

Water Treatment Facilities Business

Our water treatment systems provide various types of water that is indispensable for production venues. We also offer wastewater treatment systems that purify wastewater discharged after various types of use by society and industry.

- KURITA DO BRASIL LTDA.
- KURITA SINGAPORE PTE.LTD.
- KURITA EUROPE GmbH
- KURITA TAIWAN CO.,LTD.
- KURITA CK CHEMICAL CO.,LTD.
- KURITA WATER INDUSTRIES DALIAN CO.,LTD.
- PT.KURITA INDONESIA
- KURITA WATER MALAYSIA SDN.BHD.
- HANSHI.LTD.
- KURITA AMERICA INC.



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