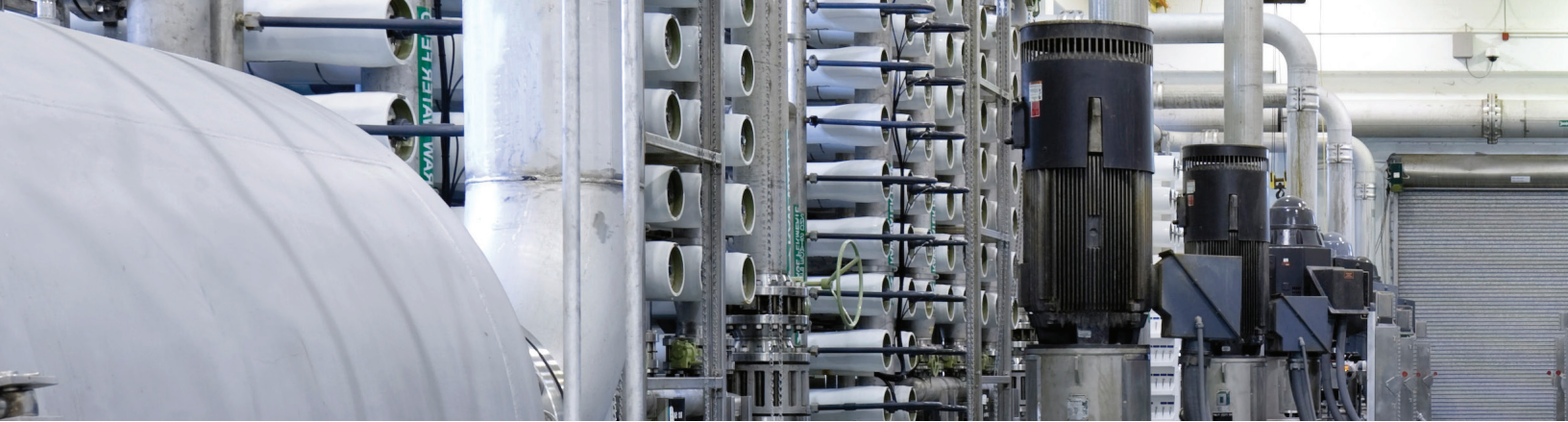




Membrane Treatment Solutions

- Reduce operational costs
- Increase plant productivity
- Maximize membrane life cycle
- Optimize system performance



AVISTA™ GLOBAL PRODUCTS AND SERVICES

A global line of Avista membrane chemicals is manufactured by Kurita blending facilities worldwide. Avista products are membrane compatibility tested and supported by Avista Advisor™Ci dosing software and laboratory services.

Avista | Membrane Autopsy

The Avista™ Membrane Autopsy service is customized to target specific customer challenges. Chromatic Elemental Imaging™ (CEI) is used for accurate, high resolution imaging that identifies the exact location and concentration of elements in a foulant sample.

Avista | OSCAR

When cleaning on-site is not practical or possible, Avista™ OSCAR off-site cleaning and restoration is available to restore membrane performance to original manufacturer specifications.

Avista | Black Box

The Avista™ Black Box is a proprietary, stand-alone monitoring device that replicates membrane performance without interrupting the operation of the full-scale system.

Avista | Advisor™Ci

Avista™ Advisor™Ci proprietary software provides accurate projections for Avista specialty membrane chemicals.

- Robust calculation engine
- Metal dosing factor
- Rate of reaction
- High recovery applications
- Complex ion technology

Kurita is one of the global market leaders in the treatment of membrane systems. With more than 70 years' experience, we provide you with state-of-the-art solutions, tailored to the specific needs of your system.

Kurita offers local support services to optimize membrane system performance and a wide range of membrane treatment solutions, including chemicals, equipment, and services.

We take the continuous improvement of your plant availability to heart. Our aim is to support you in reducing water and chemicals consumption while also focusing on environmental respect and sustainability. For good reason, Kurita is already for ten years one of only 30 enterprises which are listed in the "NAI" (Nature-Stock-Index).

MEMBRANE TREATMENT SOLUTIONS

System Audit

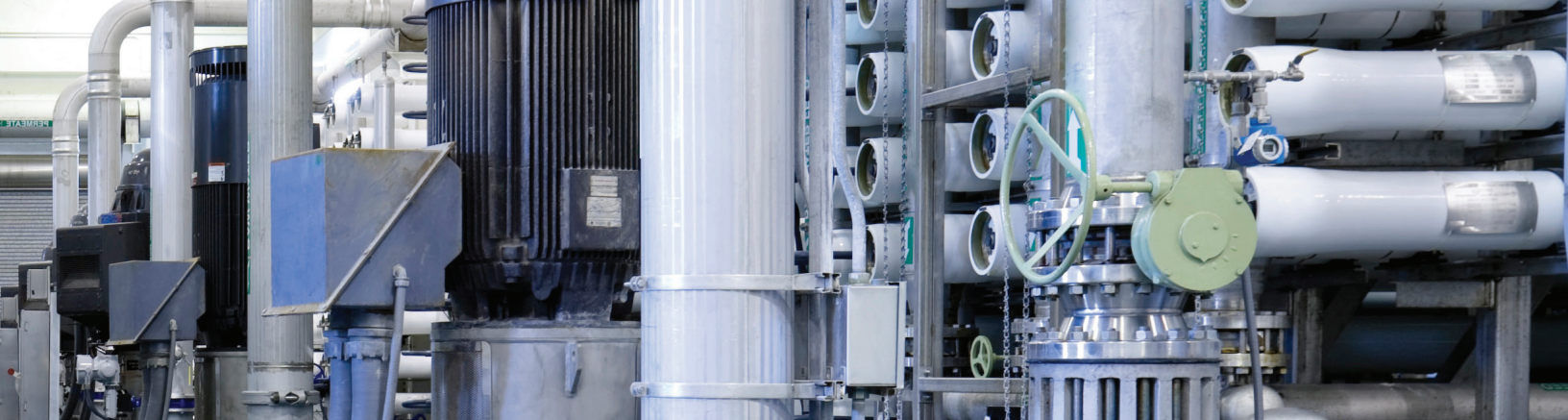
To understand and assess system requirements, Kurita completes an initial audit in consultation with the Client. The purpose of the audit is to determine operating conditions, performance objectives, infrastructure constraints, pre/post treatment, and membrane condition. The results of the audit are used as a basis for product selection and a recommended support package.

Troubleshooting and Optimization

Kurita works with Clients on a proactive and reactive basis to maintain and improve system performance. We use the results of modeling and autopsies to adjust system configuration and work closely with operational staff during process upsets. We acknowledge the dangers of taking a set-and-forget approach to specialty chemicals, as this often leads to unnecessary costs, shorter membrane life, and compromised system performance.

OUR COMPREHENSIVE SERVICE INCLUDES:

- System survey and system analysis
- Development of customized treatment concepts and specific cleaning procedures
- Analysis (on-site and in our laboratories)
- Deposit analysis
- Microbiological analysis, including identification of type
- Membrane autopsy with full report
- Flat sheet tests
- Chemical dosing projections for the best definition of treatment and dose ate
- Training of your staff
- Logistics (transport and stock management)



TECHNOLOGIES, FEATURES, AND APPLICATIONS

Our comprehensive product range enables Kurita to specifically target contaminants that would otherwise impact system operation.

<p>ANTISCALANTS</p> <p>Scaling within reverse osmosis (RO) membranes is a serious matter, as scaling can drastically reduce system performance, and the abrasive scale deposits may cause irreversible damage to the rejecting membrane surface.</p>	<p>Specific programs against precipitation of salts, based on:</p> <p>Phosphorus-containing and phosphorus-free treatments:</p> <p>Products certified to NSF/ANSI 60:</p>	<ul style="list-style-type: none"> • Calcium and magnesium hardness deposits • Calcium phosphate and calcium fluoride • Calcium, barium and strontium sulfate • Iron oxide • Silica and manganese <ul style="list-style-type: none"> • In dependence of local legislation <ul style="list-style-type: none"> • Preparation of drinking water
<p>CLEANERS</p> <p>Cleaning membranes in RO systems removes mineral scale, organic matter, biological growth, colloidal particles, and/or insoluble constituents, which build on or in a membrane element.</p>	<p>Specific cleaners for different types of deposits or contamination:</p>	<ul style="list-style-type: none"> • Blends of inorganic and organic acids • Combinations of complexants, alkali, caustic soda, potassium hydroxide, anionic and non-ionic detergents, and phosphates • Alkaline and/or enzymatic cleaners • Products certified to NSF/ANSI 60 for the preparation of drinking water
<p>BIOCIDES</p> <p>Biological fouling of RO membranes is one of the most challenging issues faced by operators of polyamide membrane separation systems.*</p>	<p>Effective biocides must be non-oxidizing to avoid permanent damage to the polyamide membrane:</p>	<ul style="list-style-type: none"> • Fast-acting biocides • Environmentally friendly non-oxidizing biocides • Chlorine and oxidizing biocide removers • Products to protect the membrane from the attack of aggressive biocides
<p>COAGULANTS</p> <p>Colloids and silt fouling are major causes of performance decline in RO membrane systems. As a result, many system designs include upstream Multimedia Filtration (MMF) to enhance particulate removal and improve the feedwater quality to downstream membrane systems.</p>	<p>Membrane compatible coagulants improve efficiency of MMF equipment by increasing particulate removal:</p>	<ul style="list-style-type: none"> • Provide a higher quality feedwater to downstream membrane systems • Reduce cleaning frequencies • Increase system run times
<p>CHLORINE SCAVENGER</p> <p>Membranes can last for days or years depending on the care they receive. Chlorine in feedwater can permanently damage membranes, requiring them to be replaced.</p>	<p>Unique formulations to remove free and combined chlorine from RO system feedwaters:</p>	<ul style="list-style-type: none"> • Protect membranes from oxidation damage • Certified for use in systems producing potable water • Odorless and stabilized to prevent off-gassing, making it ideal for indoor installations

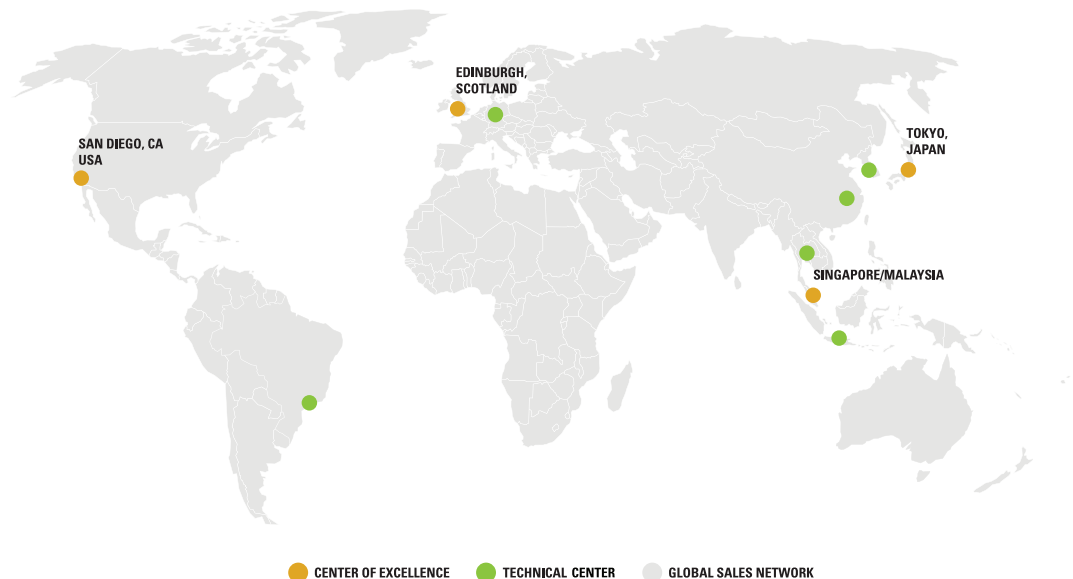
*Use biocides safely. Always read the label and product information before use.



Avista™ | Center of Excellence

To truly make an impact on the challenges faced daily by membrane system plant operators, managers, and design engineers, Kurita established the Avista Center of Excellence (CoE). The Avista CoE's first task was to evaluate and combine the best of both companies' RO membrane chemicals, technologies, services, and best practices to create one industry-leading platform.

The Avista CoE leadership team is located in the United States, Japan, Malaysia, Singapore, and the United Kingdom to support each region's technical centers and global sales network.



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