



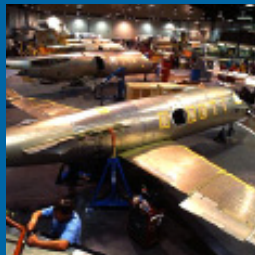
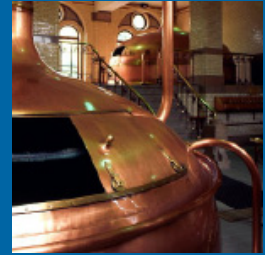
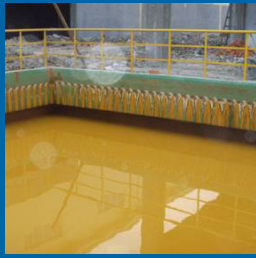
Municipal and Industrial Wastewater Treatment





## Experience and Technology





## The Haliant Difference



“Haliant Technologies will be driven to completely satisfy the pure water and wastewater treatment needs of its customers. Furthermore, the collective experience and technical expertise of our team will be applied in the most cost – effective and innovative way to conserve, reclaim, and reuse our most precious natural resource – water. To this end, our responsibilities extend beyond those of a premier supplier of membrane filtration systems to include demonstrating the benefits of using our technology to preserve the environment for future generations.”

Edward Closuit, President

# About Haliant Technologies

## Providing Complete Water Treatment Solutions

Haliant Technologies is a multi-national Environmental Engineering Company with headquarters in the United States and offices in Shanghai, China. We have over a decade of experience in engineering and design of water and wastewater treatment and manufacture of membrane separation systems. Haliant and its principals have successfully completed thousands of water and waste water treatment projects and have an impressive client list of the most prominent companies in the United States, Canada, Mexico, South America, Europe, Asia, Middle East, and China.

Haliant Technologies is a complete solution provider for Municipal and Industrial Water Treatment and Waste Water Treatment and Reuse. Haliant specializes in execution of turnkey projects from initial requirement to commissioning. With a team of water treatment professionals, Haliant is proud of its strong and innovative capabilities of analysis, testing, design, engineering, manufacturing or supply of equipment, installation, and operation and maintenance.

ABOUT HALIANT TECHNOLOGIES



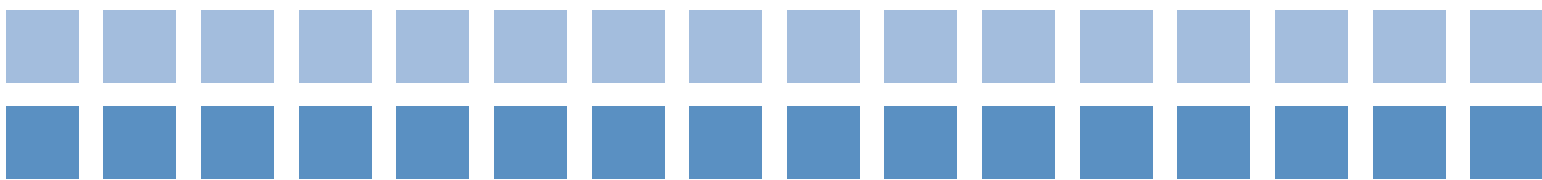
Distribution Center in California



Manufacturing Plant in Florida



Sales Office in China



# Haliant Technologies' Products

## The Haliant Difference

Haliant Technologies is unique in its ability to combine years of experience in solving water and wastewater problems with exclusive access to the latest technology available worldwide. Haliant is committed to its customers' success by providing superior service and technical excellence while delivering unsurpassed levels of value and cost efficiency.

Haliant Technologies specializes in the application of the latest membrane separation techniques while utilizing complementary treatment methods to provide the complete system.

- Biochemical Treatment
- Membrane Bio-Reactor (MBR)
- Membrane Chemical-Reactor (MCR)
- Chemical Treatment
- Ion Exchange
- Microfiltration (MF)
- Ultrafiltration (UF)
- Nanofiltration (NF)
- Reverse Osmosis (RO)
- Electro-Deionization (EDI)



# Electroplating

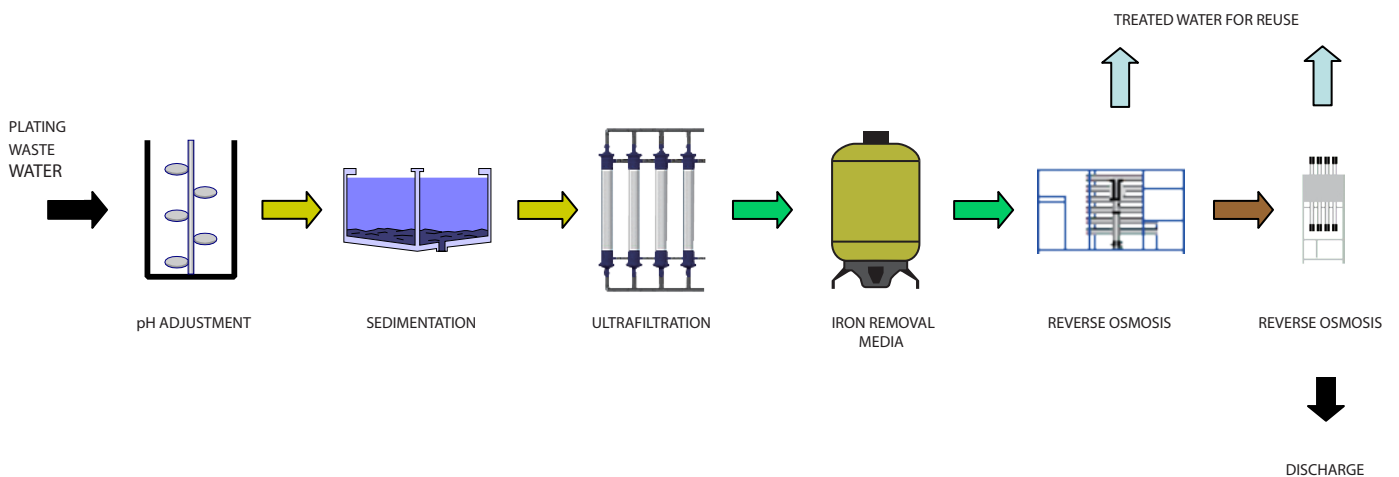


Wastewater from electroplating processes contains elevated concentrations of heavy metals, suspended solids (TSS), dissolved solids (TDS), and can also include iron, oil, and organic contaminants. In 2007, Haliant Technologies commissioned a wastewater reclaim system to recover and purify 95% of the electroplating and coating wastewater for reuse in production.

Haliant utilized a combination of treatment technologies including chemical-induced precipitation of solids, ultrafiltration for removal of oil, organics, and TSS, media filtration for iron removal, and reverse osmosis for TDS reduction.

Purifying 95% of the electroplating and coating wastewater for reuse in production

Treated Water Results	Raw Water	Treated Water
Chemical Oxygen Demand (COD)	300 mg/L	< 10 mg/L
Total Suspended Solids (TSS)	350 mg/L	< 1 mg/L
Dissolved Iron	10 mg/L	< 1 mg/L
Total Dissolved Solids (TDS)	2,000 mg/L	150 mg/L



# Chemical Manufacturing

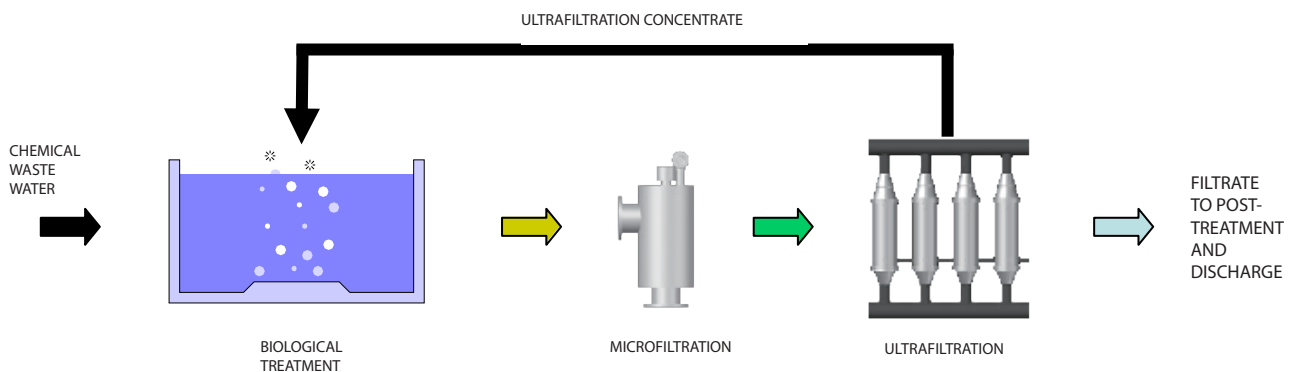
Chemical manufacturers can produce some of the most challenging wastewaters – high in COD, organics, TDS, TSS, and oils. Haliant designed, manufactured, and installed a wastewater treatment system in 2008 to treat chemical wastewaters with very high COD and TDS in addition to concentrations of many organic solvents including toluene.

Haliant utilized a ceramic ultrafiltration membrane system to supplement the existing biological treatment system to form a membrane bioreactor (MBR) process. Ceramic membranes proved to be resistant to solvents in the wastewater and capable of producing high-quality filtrate.



Recycling of the UF concentrate increased biomass and improved the efficiency of the biological treatment

Treated Water Results	Raw Water	Treated Water
Turbidity	> 300 NTU	< 1 NTU
Total Suspended Solids (TSS)	15,000 mg/L	< 10 mg/L
Chemical Oxygen Demand (COD)	> 3,000	> 500 mg/L



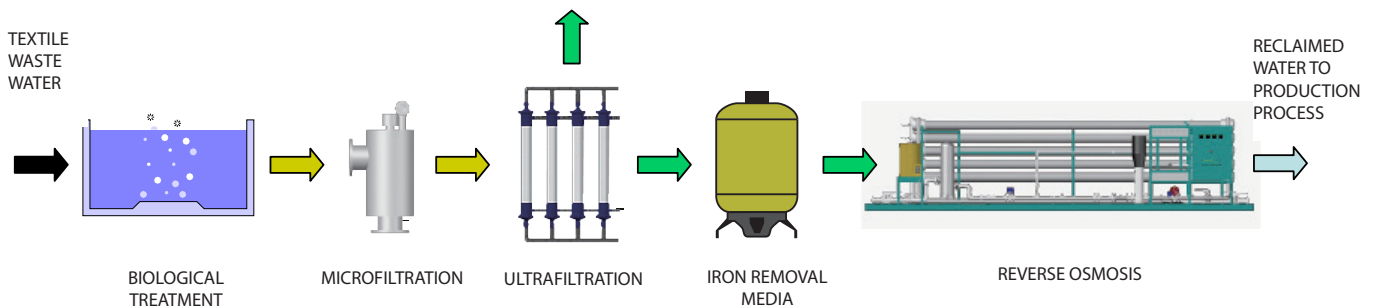
# Textile Manufacturing



Wastewater from textile production processes are typically high in Chemical Oxygen Demand (COD), total suspended solids (TSS), hardness, total dissolved solids (TDS), and can also include iron, oil, color, and organic contaminants. In 2010, Haliant Technologies commissioned a wastewater reclaim system to treat textile wastewater for both miscellaneous use and for make-up water for production.

Haliant utilized a combination of treatment technologies including ultrafiltration (UF) for removal of COD, organics, and TSS, media filtration for iron removal, and reverse osmosis (RO) for hardness and TDS reduction. The UF filtrate water is suitable for general use in the facility, while the RO product water is as pure as the make-up water from the municipal water supply.

Treated Water Results	Raw Water	Treated Water
Dissolved Iron	< 10 mg/L	< 1 mg/L
Total Suspended Solids (TSS)	65 mg/L	< 1 mg/L
Chemical Oxygen Demand (COD)	120 mg/L	< 10 mg/L
Total Dissolved Solids (TDS)	2,600 mg/L	< 250 mg/L





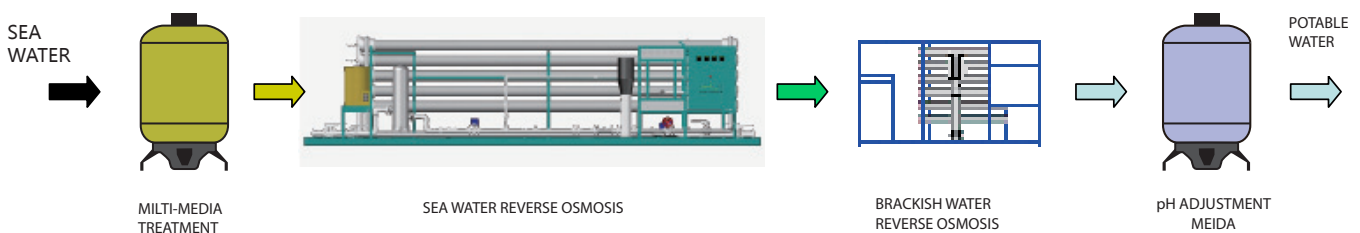
# Sea Water Desalination

In some locations, the only water available is from the sea. Seawater salt content is typically about 3.5%, but can exceed 5%. The major cost of desalting water is the energy required to achieve the high operating temperatures or pressures needed to separate the water from the salt. Haliant utilizes the latest energy recovery technology to provide the most energy-efficient desalination equipment available.

In 2004, Haliant Technologies commissioned a seawater desalination system to provide essentially all the potable water for an island community. Haliant's energy-saving design provided operating costs of less than 3 kwh electricity consumption per m3 of potable water.



Treated Water Results	Raw Water	Treated Water
Turbidity (NTU)	> 5 NTU	< 1 NTU
Hardness	> 200 ppm	< 1 ppm
Total Dissolved Solids (TDS)	38,000 mg/L	150 mg/L



# Power Generation

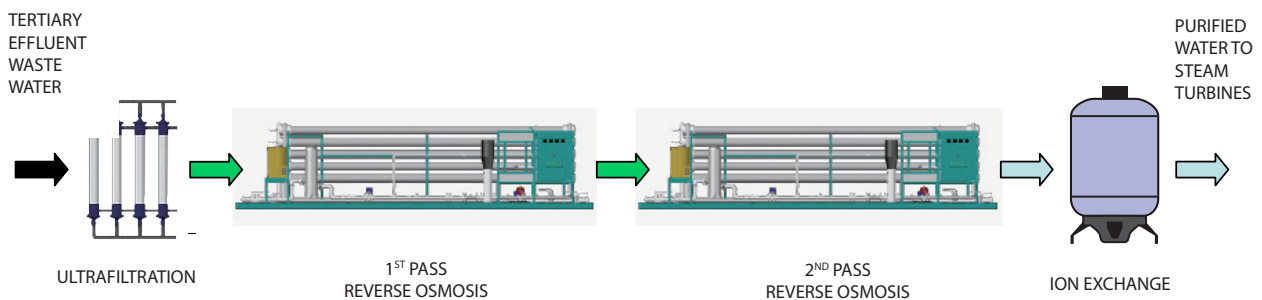


Power plants require pure water for boilers and steam turbines. Haliant's comprehensive product line includes all the technologies best suited for power plants - ultrafiltration, reverse osmosis, ion exchange, and electro-deionization..

Equipment from Haliant Technologies now treats municipal wastewater at the largest waste-to-energy power plant in the USA. This equipment has allowed the plant to completely eliminate its use of potable make-up water and now all of the purified water is reclaimed from

100% of make-up water is now from reclaimed wastewater instead of from potable supplies

Treated Water Results	Raw Water	Treated Water
Turbidity	> 5 NTU	< 1 NTU
Total Suspended Solids (TSS)	50 mg/L	< 1 mg/L
Biological Oxygen Demand (BOD)	25 mg/L	< 1 mg/L
Total Dissolved Solids (TDS)	1,500 mg/L	< 0.5 mg/L





# Irrigation / Agriculture

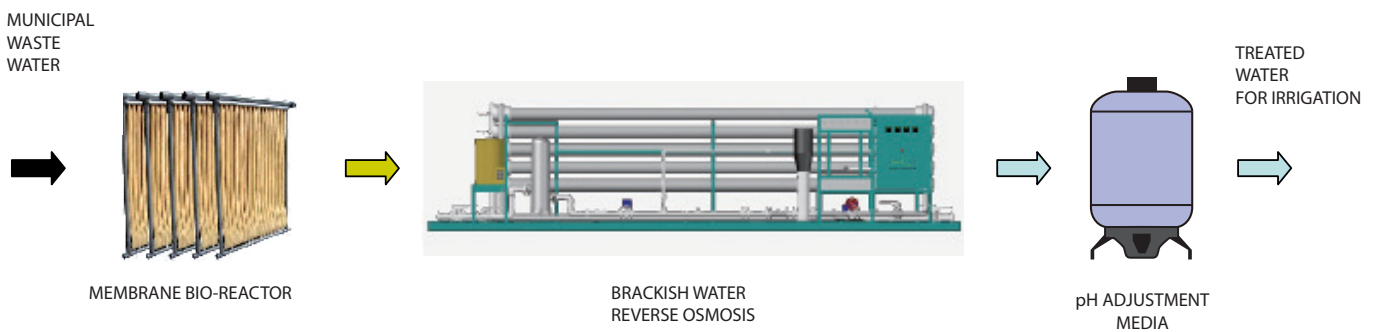


Yields of irrigated crops and other agricultural products are greatly influenced by the quality of the irrigation water. Haliant's principals designed and supplied a complete wastewater treatment system to reclaim tertiary effluent from the local wastetreatment plant for use in irrigating seed-lings in a nursery.

Previous use of the untreated effluent resulted in considerable yield loss. The new system, utilizing chlorine-tolerant reverse osmosis, produced water ideal for seedling growth.

Membrane separation is the preferred method to reclaim wastewater for irrigation.

Treated Water Results	Raw Water	Treated Water
Turbidity	> 10 NTU	< 0.1 NTU
Total Suspended Solids (TSS)	> 500 mg/L	< 1 mg/L
Biological Oxygen Demand (BOD)	> 200 mg/L	< 10 mg/L
Total Dissolved Solids (TDS)	> 1,500 mg/L	< 100 mg/L



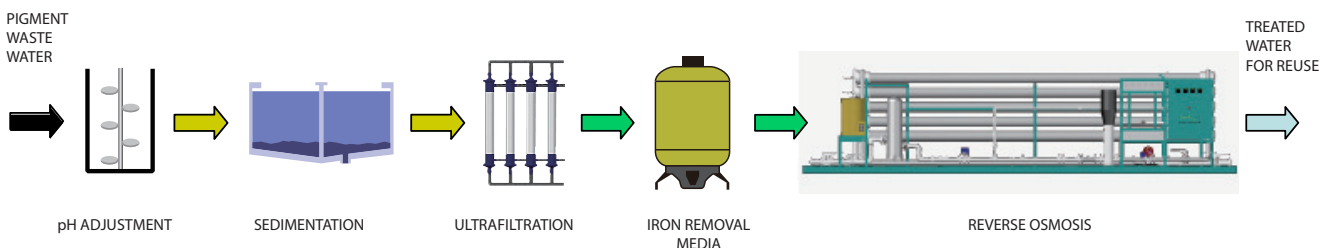
# Pigment Production

Pigment manufacturers generate significant quantities of wastewater containing high levels of Chemical Oxygen Demand (COD), and total suspended solids (TSS) and total dissolved solids (TDS). Haliant provided the wastewater treatment system for a large pigment producer with excessive concentrations of TDS, TSS, and dissolved iron.

The Haliant-supplied system utilizes a combination of bio-chemical and membrane filtration treatment. The bio-chemical treatment precipitates the dissolved iron, adjusts the pH, and removes the suspended solids to a level compliant with discharge standards. Ultrafiltration and reverse osmosis membranes treat the bio-chemical effluent to a level suitable for reuse in production.



Treated Water Results	Raw Water	Treated Water
Dissolved Iron	131 mg/L	< 1 mg/L
Total Suspended Solids (TSS)	> 500 mg/L	< 1 mg/L
Chemical Oxygen Demand (COD)	71 mg/L	< 1 mg/L
Total Dissolved Solids (TDS)	> 10,000 mg/L	< 300 mg/L



# Landfill Leachate

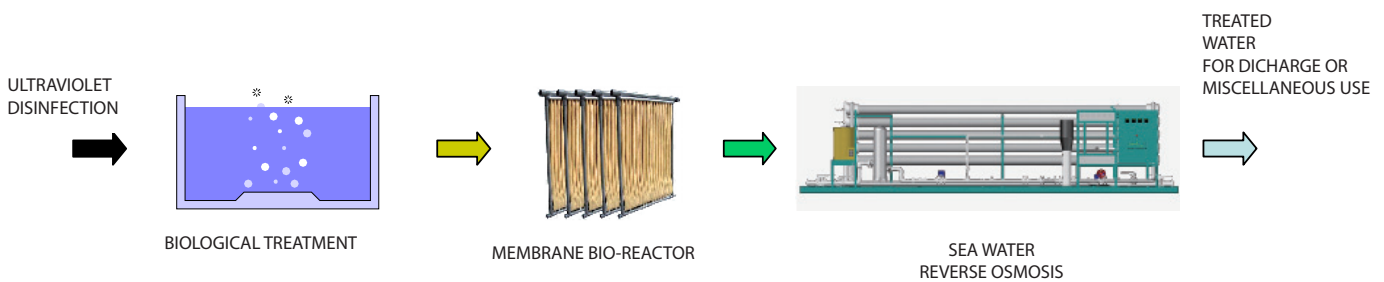


Leachate from solid waste landfills is an increasing wastewater treatment issue. The leachate wastewater is usually very high in COD, BOD, and dissolved solids. Conventional biological wastewater treatment is often insufficient to treat the leachate wastewater to comply with environmental discharge regulations.

Membrane Bio-Reactor (MBR) systems from Haliant Technologies can often treat the landfill leachate wastewater enough to meet discharge requirements. In extreme cases, MBR systems can be used as pre-treatment for downstream bio-chemical or membrane filtration processes - especially if the water is to be reclaimed for miscellaneous use.

LANDFILL LEACHATE

Treated Water Results	Raw Water	Treated Water
Ammonia Nitrogen (NH3-N)	2,000 mg/L	< 15 mg/L
Chemical Oxygen Demand (COD)	10,000 mg/L	< 10 mg/L
Total Dissolved Solids (TDS)	15,000 mg/L	< 100 mg/L



# Oily Wastewater

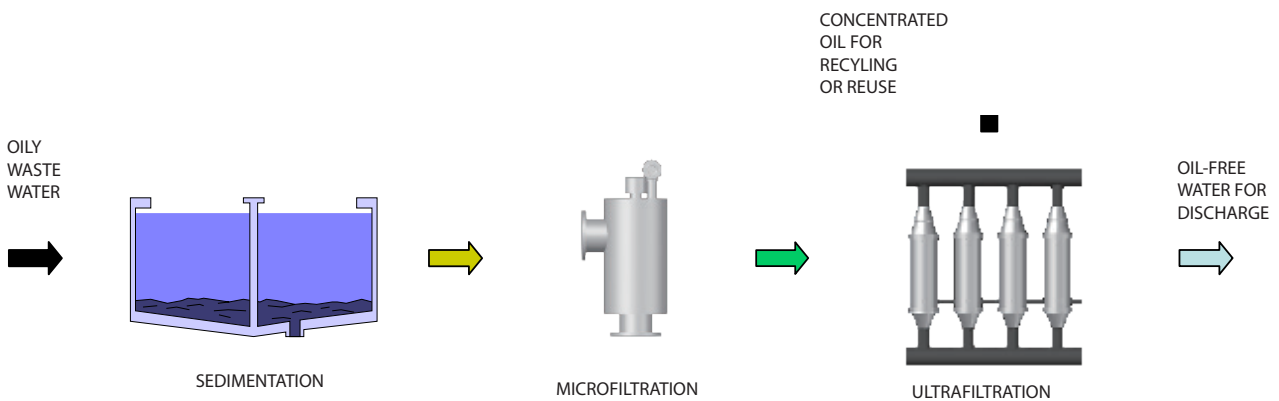
Manufacturers utilizing machining, turning, cutting, and other metal fabrication operations are often faced with recovery and disposal of coolant and cutting fluids. These fluids include extremely high levels of emulsified oils that can be reused if other contaminants are removed, but cannot be easily discharged.

Ultrafiltration systems from Haliant Technologies have been used to separate the waste oils from the reusable cutting fluids, reducing the manufacturers operating and disposal costs.

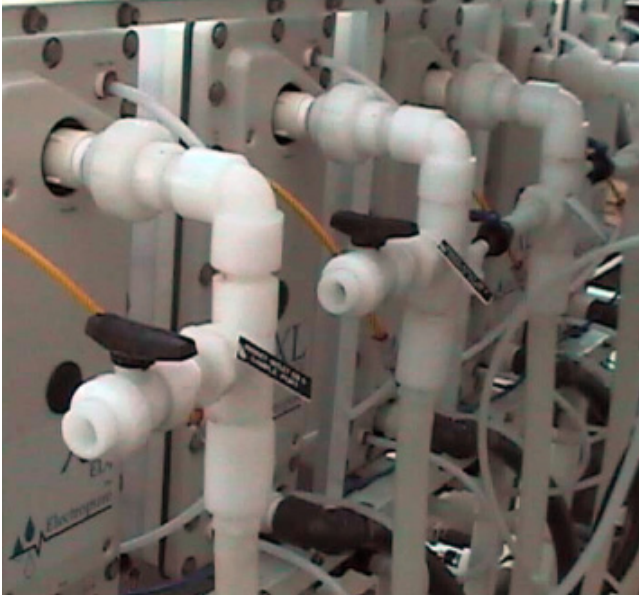
Haliant Technologies has also supplied complete waste water treatment systems to remove the dissolved solids from the ultrafiltration effluent and prepare the treated wastewater for compliant discharge or reuse.



Treated Water Results	Raw Water	Treated Water
Oils and Greases	20,000 - 70,000 mg/L	10 mg/L
Total Suspended Solids (TSS)	200 - 1,000 mg/L	< 10 mg/L
Chemical Oxygen Demand (COD)	3,000 - 50,000 mg/L	500 - 3,000 mg/L



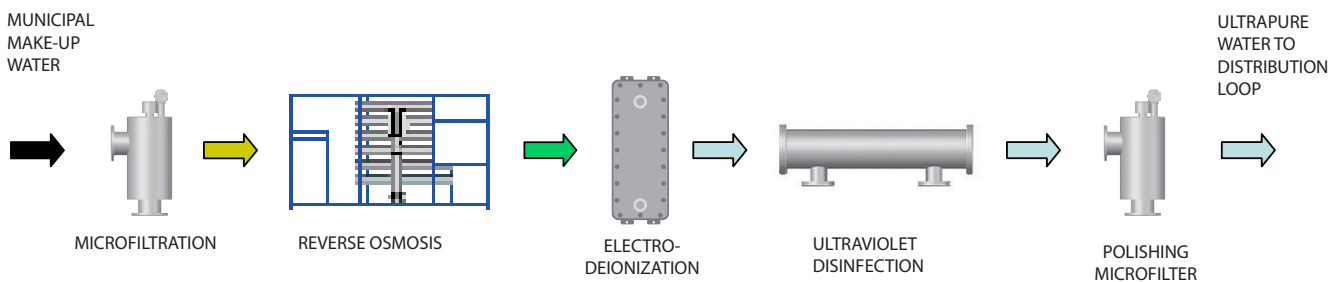
# Electronics Manufacturing



Electronics, semiconductor, and other manufacturers of high-technology products are constantly in need of ultrapure water. Haliant Technologies has the experience and products to provide the right ultrapure water solution for the electronics industry, including double-pass reverse osmosis (RO), electro-deionization (EDI), and ion exchange.

Haliant has supplied an electro-deionization system for one of the world's largest DVD producers. This EDI system features all PVDF product water piping and treats 1-pass RO permeate for final polishing by mixed-bed ion exchange. Use of the Haliant-supplied equipment allowed the user to extend the service life of the ion exchange resin tenfold.

Treated Water Results	Raw Water	Treated Water
Turbidity	< 5 NTU	< 0.01 NTU
Total Suspended Solids (TSS)	< 50 mg/L	> 6 - log removal
Chemical Oxygen Demand (COD)	25 mg/L	> 6 - log removal
Total Dissolved Solids (TDS)	< 1,000 mg/L	> 15 megohm resistivity





# Municipal Wastewater

Haliant Technologies has the experience and products to provide new and optimize existing municipal wastewater treatment plants.

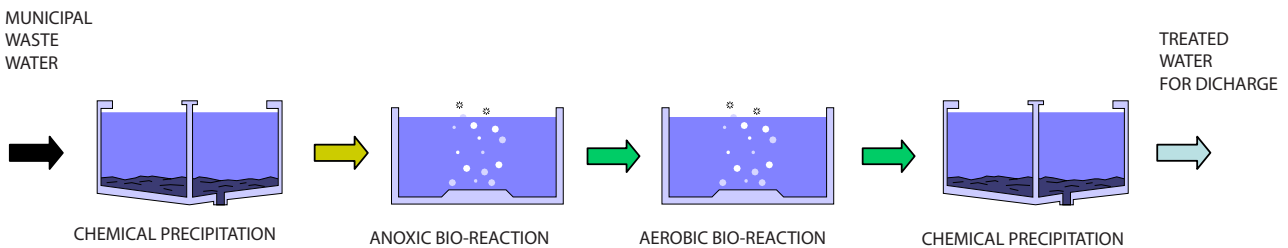
Haliant has designed, supplied, and installed the equipment and systems for state-of-the-art municipal treatment facilities. Incorporating the equipment and recommendations of Haliant, this municipal wastewater treatment plant was able to expand its capacity from 100,000 m<sup>3</sup>/day from to 300,000 m<sup>3</sup>/day and comply with all relevant environmental discharge standards.



The application of the membrane separation technology in the municipal wastewater

MUNICIPAL WASTEWATER

Treated Water Results	Raw Water	Treated Water
Ammonia Nitrogen (NH <sub>3</sub> -N)	< 40 mg/L	< 25 mg/L
Biological Oxygen Demand (BOD)	400 - 800 mg/L	< 30 mg/L
Chemical Oxygen Demand (COD)	1,200 - 1,800 mg/L	< 120 mg/L
Total Suspended Solids (TSS)	200 - 300 mg/L	< 100 mg/L



# Pharmaceutical Manufacturing

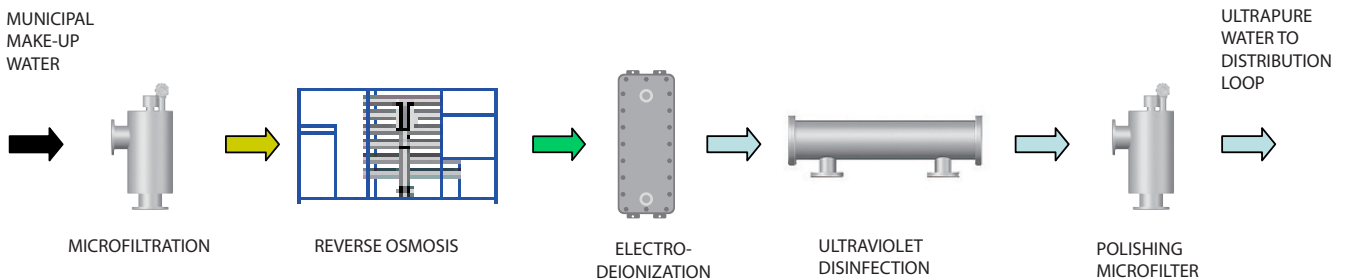


Pharmaceutical manufacturers need ultrapure water that meets USP standards reliably and affordably.

Haliant Technologies supplied this double-pass reverse osmosis system to a major multi-national pharmaceutical producer. This system includes 316L stainless steel sanitary piping and fittings and produces product water of less than 1 us/cm conductivity.

Haliant has supplied similar ultrapure systems for pharmaceutical manufacturers using electro-deionization (EDI) technology as post-treatment of the reverse osmosis permeate. EDI systems from Haliant Technologies consistently yield product water with greater than 10 megohm resistivity.

Treated Water Results	Raw Water	Treated Water
Turbidity	< 5 NTU	< 0.01 NTU
Total Suspended Solids (TSS)	> 25 mg/L	> 6 - log removal
Biological Oxygen Demand (BOD)	< 25 mg/L	> 6 - log removal
Total Dissolved Solids (TDS)	< 1,000 mg/L	< 0.5 mg/L



# Project Reference List

## Beverage Production



## Consumer Products



## Automotive



## Manufacturing / Industry



## Electronics



## Power Generation



## Pharmaceutical Industry



## Chemical Industry





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