



OVIVO[®]
Bringing water to life[®]

Water specialists for the Petrochemical Sector

creating value in water through innovation, creativity and expertise

ovivowater.com

Ovivo: A market Leader

As society and the global economy demand more and more from water, there is a growing requirement for ever more applications to manage clean water, to create specialist process waters, to treat wastewater, to extract energy from wastewater and to champion the reuse of water.

Many of the best known, most respected and reliable brand names in the water and wastewater industries are part of Ovivo's heritage. The combined strengths of our brands and talents, including Brackett Green, Caird & Rayner Clark, Christ Water Technology and Eimco Water Technologies create one of the most comprehensive bank of technologies in the sector, one of the most impressive list of references, and practical application knowledge.

Ovivo aims to become the water partner of choice for clients in the public and private sectors and the leading source of water expertise for engineers and consultants across the globe. Get in touch with some of the best brains in the business.

For further information, visit
ovivowater.com



Ovivo - creating value in water through innovation, creativity and expertise in clean water, process water, wastewater treatment, waste-to-energy and water reuse markets across 5 continents.



Ovivo - bringing water to life



Our Role in your Industry

Petrochemicals are valuable products, the production of which demands efficiency and that efficiency is tied tightly to the production, processing and use of water. Often, water sources are located far from the places of petrochemical processing. Almost always, the petrochemical sector's treatment of water is subject to exacting standards and environmental regulations. As populations grow and the competition for water resources increases, we will help you make the most effective use of the water resources available to you. Ovivo can be relied upon to recommend the ideal processes, technologies and products for our clients to address their particular circumstances and meet their specific requirements.

At Ovivo, we are dedicated to managing the water resources that are vital to the petrochemical industry. Whatever your need, wherever you are based, Ovivo has the solutions to ensure that your company makes the most cost-effective use of the water resources you employ. Ovivo aims to help you maximize your output, meet the regulatory requirements of your local sites and minimize your environmental impact.

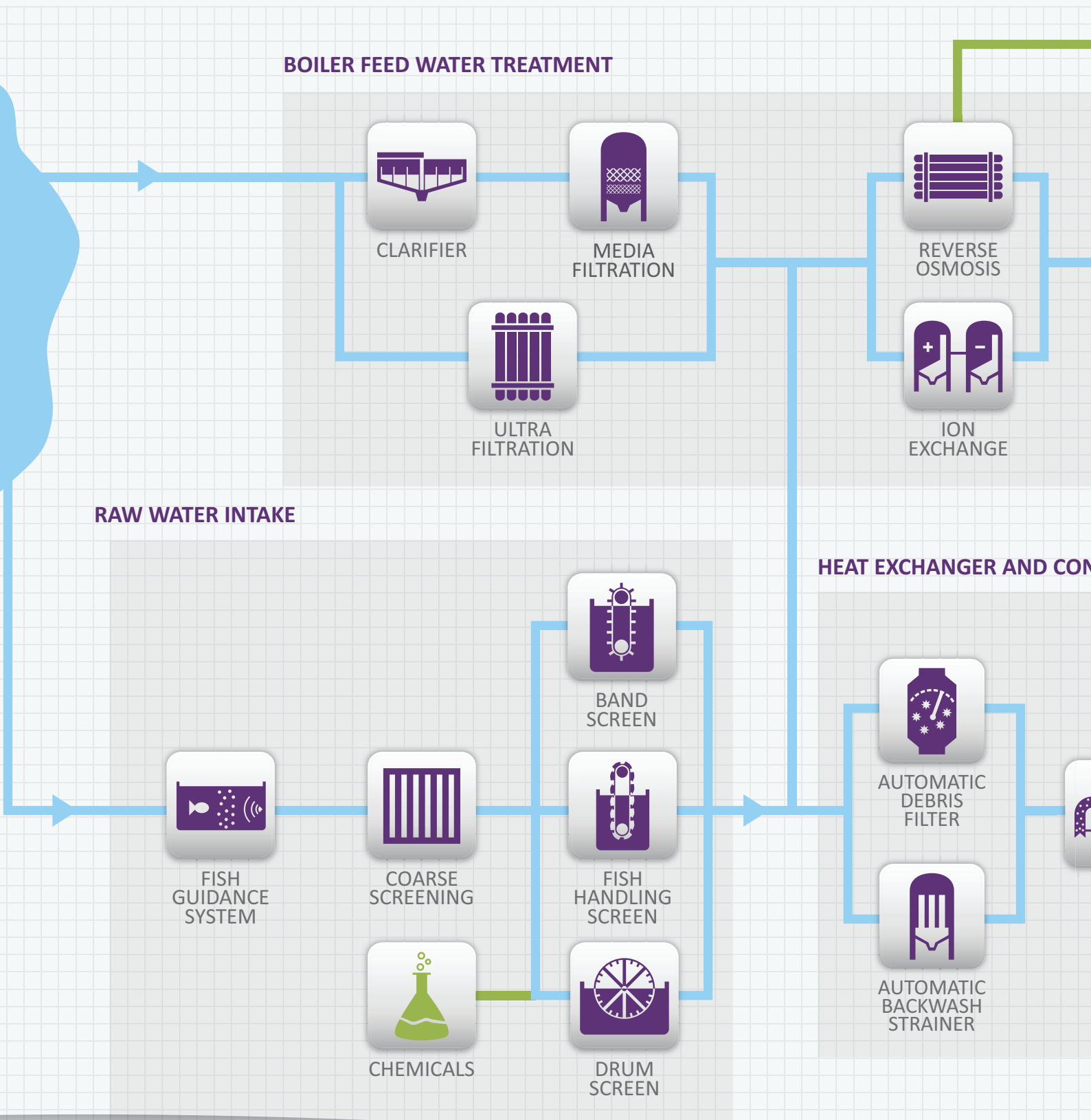
Creating Value

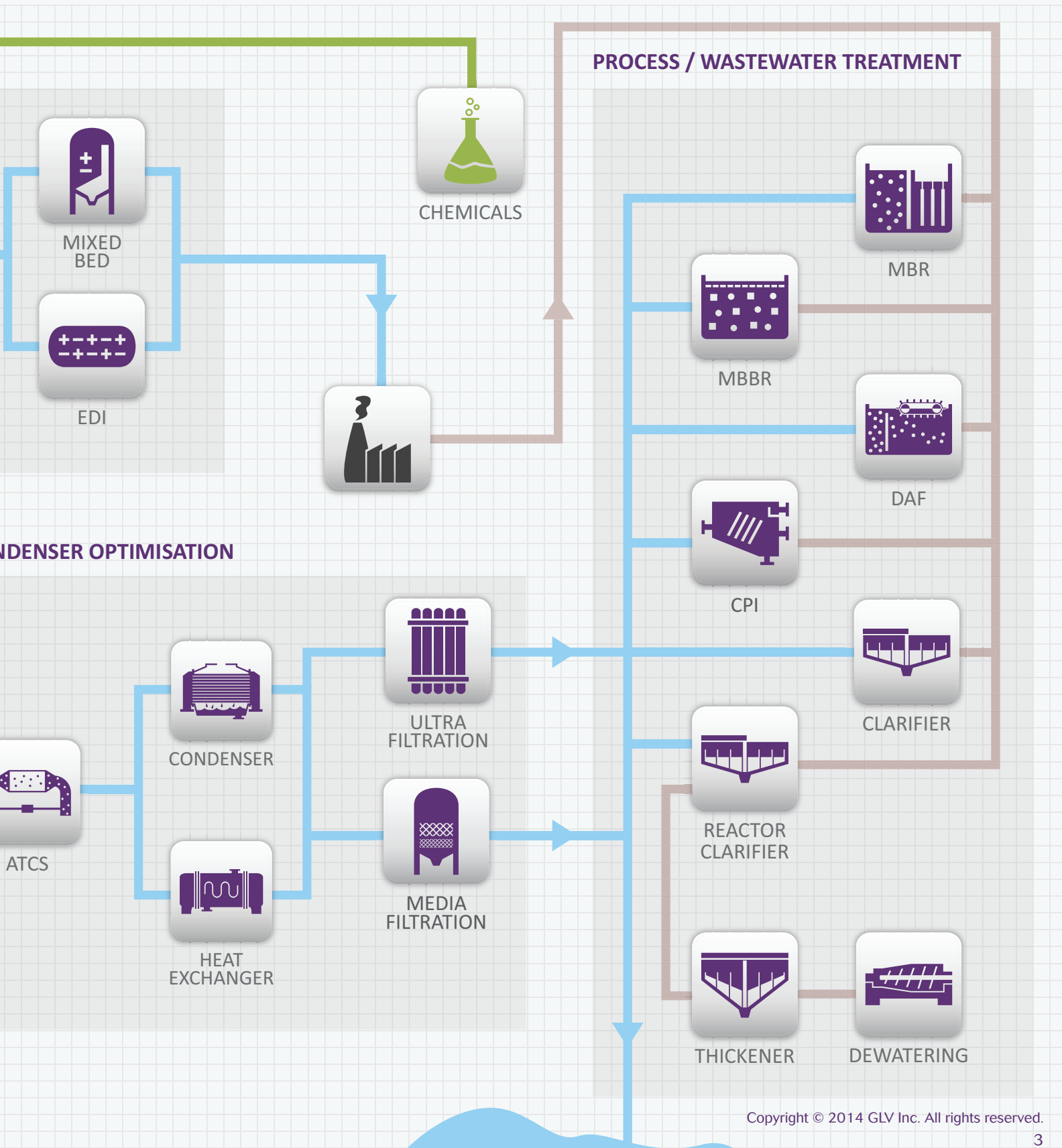


From evaluation of the best technical solution to installation and process optimization, we deliver complete processes with efficient performance based on decades of experience, technical know-how and an extensive range of proven in-house technologies.



Ovivo Water and Wastewater Solutions





Raw Water Treatment

Water is essential to the efficient achievement of many industrial processes. Ovivo's aim is to provide water intake systems that will deliver high quality raw water so that your processes run flawlessly and efficiently.



Raking Machines

Ovivo's Brackett Bosker® raking machines provide a cost-efficient way of cleaning bar screens, your first line of defense removing large debris from intake water. The raking system features a simple design and proven concept that our engineers can customize, as needed, for every site and application; they can also retrofit conventional raking machines at existing installations.

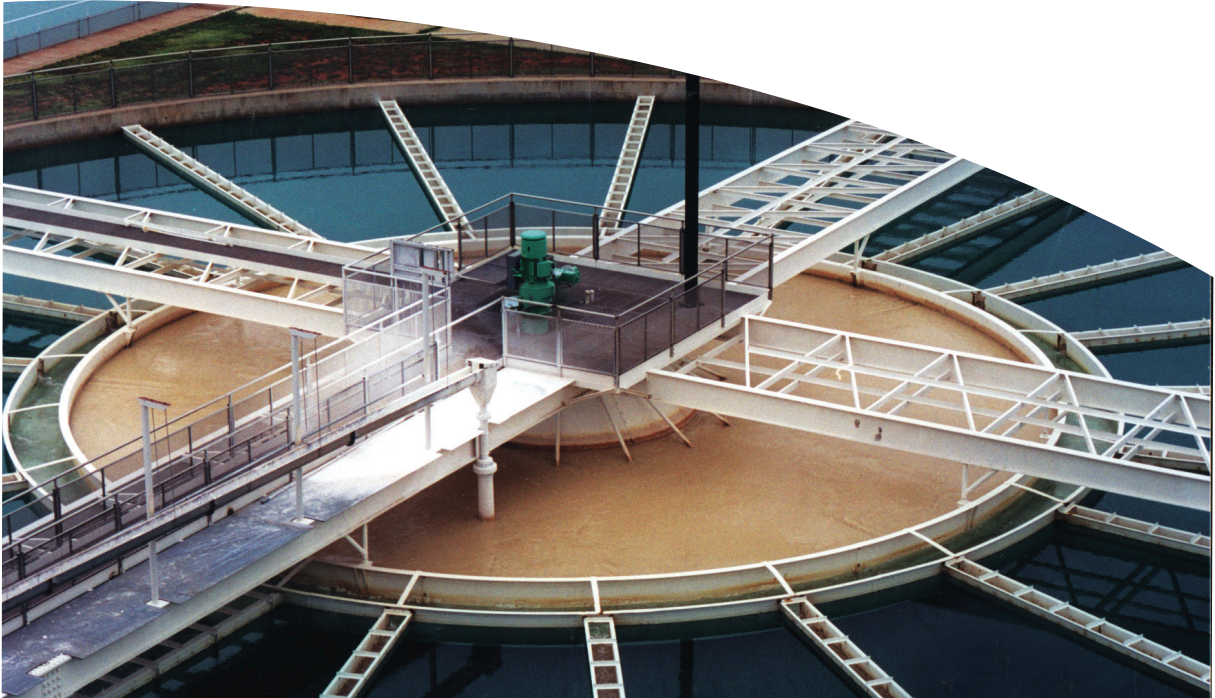


Screening

Ovivo's screening solutions are flexible, across the various operations in which our clients' sites are engaged. Ovivo systems provide reliable water quality, enabling for the effective removal of unwanted debris. They are robust enough to handle heavy solids loads, including jelly fish and can be fitted with fish protection technologies, if required.

Ovivo's equipment protects pumps, heat exchangers and other equipment from damage and fouling and helps to optimize efficiency in the treatment process.

Whatever the size of your operation, Ovivo will supply the optimal system for your application, from single band screens that remove floating and suspended solids effectively and efficiently, to drum screens that equip larger installations for the continuous removal of unwanted solids from cooling water.



Clarification

Water containing high levels of fine sediments or silt are treated by sedimentation. The water is first dosed with coagulant and then a flocculant to bring these small particles into larger flocs that will readily settle and be removed in a clarifier.

Our clarifiers are easily adaptable. Our engineers can customize designs and develop new features to satisfy any special application requirements that clients might have. Whatever the special requirement of the installation, we will provide a design to suit users' needs.

Screened water with fine silts can be treated in reactor-clarifiers with coagulant and flocculant polymer so that suspended solids can be removed as sediment from the bottom of the clarifier. Residual precipitated solids remaining after the clarifier has been employed are removed by means of backwashable granular media filtration; typically sand and anthracite media are used in these to remove impurities in the water.

Boiler Feedwater Treatment

Optimizing the energy efficiency of steam turbines leads to increasing operating pressures. The purity of the steam and the quality of the water used as boiler feedwater is of paramount importance to operating efficiency. The minutest contamination by sodium and silica can lead to problems over time. Ovivo's responsibility to its clients is to minimize any disruption. We can evaluate the best technical solutions for a new installation or recommend process optimization at existing sites. Our engineering staff and project management teams can customize processes to meet site specific quality requirements for boiler feedwater and boiler water.

Our key processes for boiler feedwater production are ion exchange demineralization and reverse osmosis, as well as different types of filtration technologies. Ovivo ion exchangers and reverse osmosis membrane technology remove mineral impurities and provide process water of the utmost purity.



Ion Exchange

Ovivo's mixed bed ion exchanger technology is used when the quality of the water from the deionization section (whether ion-exchanger or reverse osmosis type) must meet the high quality requirements of a high-pressure boiler and steam turbine.

Microfiltration & Ultrafiltration

Where even more stringent produced water effluent water quality is required (i.e. surface discharge, or produced water that may be potentially used for irrigation or process water), Ovivo offers Microfiltration (MF) or Ultrafiltration (UF) units.

These units may be followed by a nanofiltration (NF) and/or Reverse Osmosis system if the process dictates. MF has the largest pore size 0.1 to 1 microns and UF pore sizes range from 0.01 to 0.1 micron. Both designs can operate in cross flow or dead end filtration mode.

The MF and UF systems are used to primarily remove suspended solids, bacteria and to reduce turbidity. Typical membranes used for Microfiltration and Ultrafiltration are hollow fiber type.

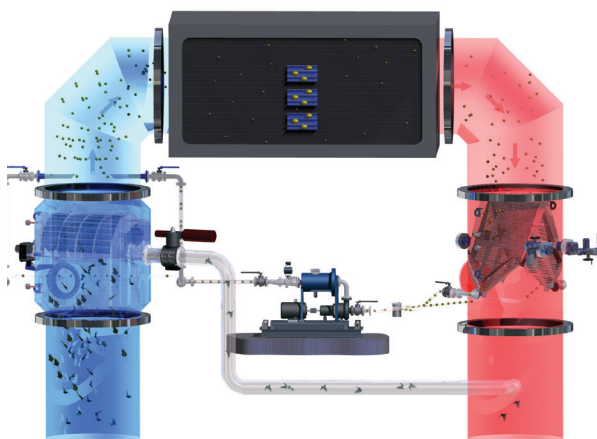
Reverse Osmosis Systems

Reverse osmosis (RO) is a water purification process that uses a selectively semi-permeable membrane. In RO, an applied pressure is applied to overcome osmotic pressure, a property that is governed by chemical potential, a thermodynamic parameter. The result is that the solute is retained on the pressurized side of the membrane and the pure solvent is allowed to the other side. Whereas MF and UF targets suspended solids, the RO targets dissolved ions.

Compared to other technologies such as evaporators, RO does not require thermal energy. Ovivo can supply a fully functional automated RO system to complement a produced water package as the process requires.

Extensive experience with boiler feedwater systems combined with the specialist know-how of a leading manufacturer of ultrapure water systems makes Ovivo the ideal partner for any operator of high-pressure boiler feed applications.

Heat Exchanger & Condenser Optimization



Heat Exchanger Optimisation

Cooling water heat exchange systems and condenser pipes can be equipped with special in-line debris filters and automatic tube cleaning systems to keep the heat transfer surfaces clean and efficient.

Debris Filters

Debris build-up inside Heat Exchanger tubes reduces a plant's performance and erodes the tubes themselves, causing them to fail. Our Automatic Self-Flushing Debris Filters' unique design fits within the cooling water line, so that the filter housing actually replaces a segment of the cooling water piping, thus eliminating the need for extra space or piping. It then removes coarse as well as fibrous debris, including plastic, clams, fish, tree roots, seaweed and pine cones.

Cleaning takes place via a rotor with several suction parts. Pressure drop is constantly monitored and, as soon as the pressure exceeds a pre-set value determined by debris accumulation, the suction rotor starts and the discharge valve opens. No further flushing devices or external pumps are needed.

In this way, the filter's unique design provides maximum debris removal at the lowest operating and maintenance costs.

Automatic Tube Cleaning Systems

Micro-fouling and scaling inside the heat exchanger tubes reduces the overall heat transfer rate and plant efficiency; corrosion deposits and surface pitting also contribute to tube failure.

Our online Automatic Tube Cleaning System (ATCS) is a permanent and highly effective solution to eliminate micro-fouling, scaling and any other surface deposits from the heat exchanger tubes.



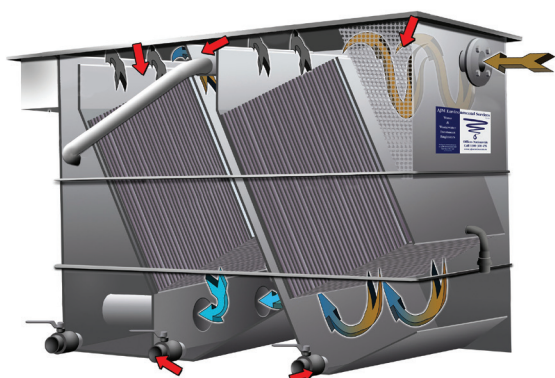
How it works:

Elastomeric balls, slightly larger in diameter than the tube, are injected into the cooling water supply. The flow of the water forces them into each tube, where they travel its length, wiping away any deposits around the inside of the tube without adversely affecting the tube surface. A special strainer in the cooling water return pipe then collects the balls as they leave the tubes and re-injects them to continually circulate within a closed loop.

Process / Wastewater Treatment

Oil-water Separation

The first stage of wastewater treatment in petrochemical applications is normally the deployment of American Petroleum Institute (API) or coalescing plate interceptor (CPI) equipment for the removal of large amounts of oil and suspended solids from the effluent. These units use gravity and density differences between oil droplets, water and suspended solids to separate the different substances from one another. When it has risen, the oil layer is skimmed from the water surface, while bottom layers of sediments are removed by a scraper and sludge pump. In CPI units, the separation of oil from water is intensified by the water motion through the plates, which collect oil droplets together as larger ones, to separate them from water more easily.



Dissolved Air Flotation

Residual oil and suspended solids are separated by Dissolved Air Flotation (DAF). During this process, pressurized air is dissolved into recycled effluent water to generate micro bubbles. The pressure is then released into the feed flow. The bubbles produce agglomerates with smaller specific gravity than that of water by attaching themselves with suspended particles. These agglomerates rise through the liquid and the air-water-solid mixture is distributed uniformly across the flotation tank, thus forming a floating sludge layer that is removed by surface skimmers. Heavier solids settle in the tank and can be discharged from the bottom. Clear liquid supernatant on the sediment layer is withdrawn under a tank baffle and over the weir for reuse or for treatment by coagulation and flocculation.

For coagulation and improved flocculation, chemical treatments are usually needed to maximize the efficiency of floc formation and separation. Emulsions of oily materials can be broken by acidification, the addition of alum or iron salts (inorganic coagulants) or by using emulsion-breaking polymers. Ovivo offers circular and rectangular DAF units of several sizes and varieties, to suit the particular needs of individual sites and to optimize the process.



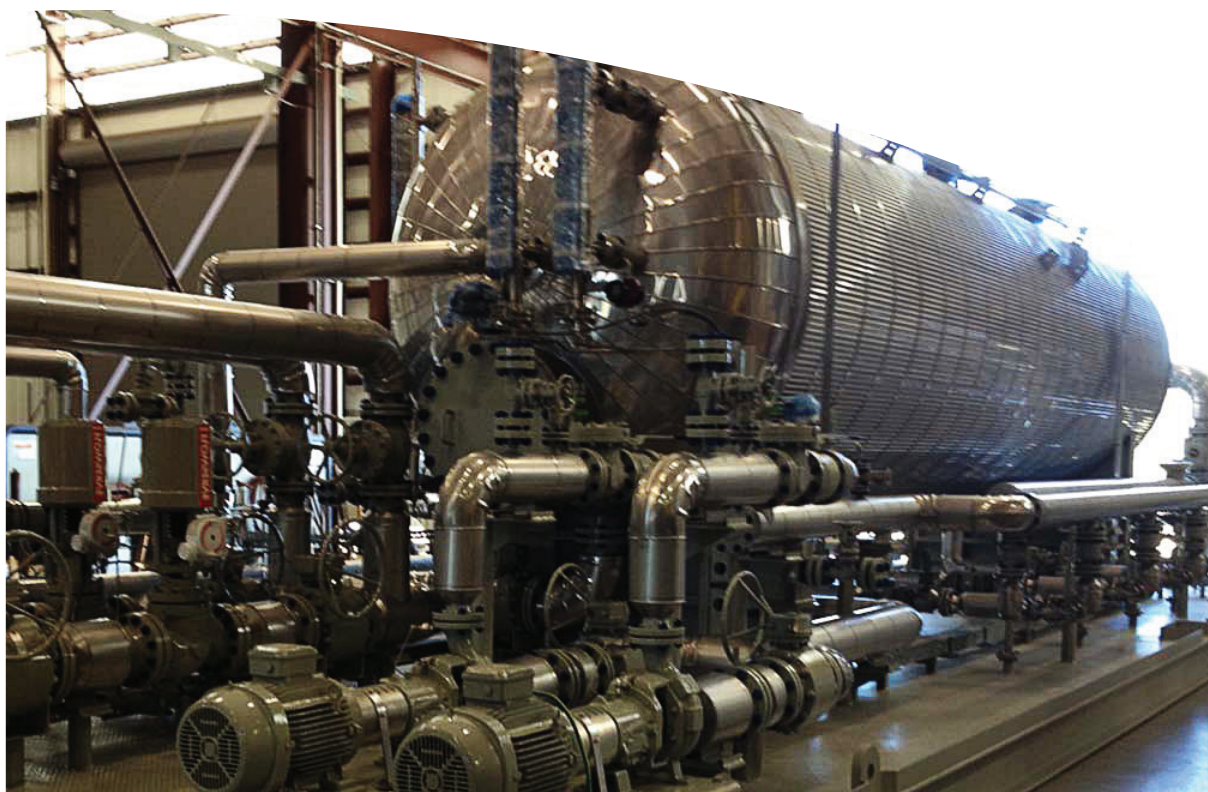
Induced Gas Flotation

Sometimes, it may be more beneficial to separate some effluent flows and treat them with an inert gas as a carrier rather than air. Ovivo can supply enclosed units that maintain control over potentially volatile organic compounds, ensuring the safety and integrity of the wastewater treatment process.

The Induced Gas Flotation (IGF) process involves introducing gas bubbles into the wastewater stream via a series of eductors. The gas bubbles are then released into the contact section of the vessel. The bubbles lift the entrained oil and solids which are then skimmed from the surface. The clarified effluent is discharged from the bottom of the vessel. The OVIVO® Float™ IGF design utilizes finely dispersed gas to reduce the apparent density of the oil and solids; increase droplets size and greatly improve buoyancy through coalescence.

Pressurized water passing through the eductor creates a vacuum at the gas suction port, whereby the gas is induced from the head space in the IGF Vessel and induced into the water stream. This is essentially a closed loop with very low gas consumption such that make-up gas requirements are 0.25 to 0.5 scf per barrel of produced water treated.

Velocities through the eductor and disperser mechanisms are critical and must be maintained near constant flow for best efficiency. A pump is provided to recirculate clean water through the eductors to maintain optimum gas entrainment.



Biological Treatment

Biological treatment removes dissolved organic hydrocarbons from water. Ovivo's compact Moving Bed Biofilm Reactor (MBBR) technology uses special, freely-moving biofilm carriers, suited for high capacity flows and particularly suited to variations in feed flow rate and quality, giving consistently high quality results. Most of the microbes cultivated for purification grow as a film on the surface of the MBBR's carrier elements. Our design avoids the blocking problems that are a traditional hazard of attached microbiological growth processes. A specially designed aeration system mixes the carrier elements amongst the treated water. The biomass that remains when water flows out of the bioreactor is separated by secondary clarification or microflotation. Offering a limited footprint and a high specific efficiency, our MBBR carriers can also be incorporated to existing active sludge processes and meet higher capacity or more stringent quality requirements, when required.

As a supplement or alternative to the MBBR carrier, on some applications, a membrane bioreactor (MBR) can be applied. In these reactors, semi-permeable membrane cartridges are submerged in the biological treatment reactor, which rejects suspended solids, allowing for the effective separation of water from the generated biomass, without the use of clarifiers.



Water Reuse & Recycle

Recycling wastewater reduces the requirement for fresh water, yielding clear environmental benefits. Membrane processes offer a high level of purification while leaving a low environmental footprint along with a relatively low energy consumption. Ovivo provides membrane solutions for water reuse and for other industrial process separation requirements. Our membrane systems encompass the spectrum of membrane filtration processes from ultrafiltration to reverse osmosis.

Ultrafiltration

Ultrafiltration with pressure cartridges removes suspended solids from water as well as colloidal material, precipitated metals, organics, bacteria and viruses. Ovivo's membrane bioreactor (MBR) system also proves to be a great solution to remove contaminants. The solution was recently selected as part of the biological wastewater treatment scheme for a major refinery in India (MRPL), with a 14,760 m³/day design flow, to generate reusable water on-site. The water produced meets the highest standards for turbidity and microbes.

Reverse Osmosis

Reverse osmosis is one of the finest form of filtration known. This process allows for the removal of microscopic particles such as ions of dissolved salts from water solutions. Ovivo's reverse osmosis techniques purify water to the most demanding specifications.



Parts & Services

Prolonging the efficient life of your assets

Ovivo takes a business-orientated view of total operating costs in water and wastewater. Each office can draw upon global best practices and in-depth application knowledge to ensure efficient and effective running of water solutions within clients' businesses.

At Ovivo we understand that water and wastewater treatment processes are not always simple operations, and therefore we can provide a dedicated team looking after your investment. Our specialist teams have extensive design experience, allowing monitoring, operation and support of your systems by personnel familiar with the workings of your equipment.

All new Ovivo products and solutions feature 'Smart Tags'. These are easily identified as they feature a distinctive QR Code (and URL) that offers our customers the power of Ovivo® ConnectSM. Ovivo® ConnectSM is a smart and simple application that allows you to easily manage your Ovivo assets throughout their entire lifecycle.

Ovivo teams worldwide can also test and confirm the operating capabilities of systems via regular inspections. Your local Ovivo team operates a quality system that conforms to ISO 9001 ensuring that:

- Communicating is as easy as possible.
- Local resources are used wherever possible.
- Costs are kept to a minimum.

Our services provide our clients with various levels of support, ranging from off-site remote support to 24/7 on-site operational support anywhere around the globe. Backed by a comprehensive telephone support service and spare parts supply agreement, Ovivo's commitment is to develop productive, long-term customer service relationships with every client. Its teams ensure that plants are kept in optimum condition, minimizing downtime for your business and enabling you to operate at optimal efficiency.

Capabilities:

- Upgrade existing equipment
- Rebuilds
- Turnkey projects
- Project management
- Labor & Service
- Field service
- Inspection of equipment
- Spare parts



Some Of Our Brands :



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The best expertise in the business, available locally, through our office network spanning the 5 continents.

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