Saur Industrial Water Solutions division

Beverage & Brewery Water Refinery and Energy Factory

A closed loop solution

#missionwater

Saur Industrial Water Solutions division

Beverage & Brewery Water Refinery and Energy Factory

A closed loop solution

Surface water
Ground water

Rain water collection

City Water

Ingredient and Process Water Treatment

Process Water

Storage and distribution of ingredient water

CIP water

CIP fluids

CIP Recovery

Biogas

Power / Green Gas

Wastewater

Waste

Wastewater, Anaerobic and Water Reuse Treatment

Process Water

Irrigation Water

To Surface water

Biogas

Power / Green Gas

Sludge to agricultural / landfil

Digital Solutions
SMART diagnostics & control

Mobile Water Solutions
Emergencies / fast track execution

DBFMO / EPC contractor / solution provider

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Saur Industrial Water Solutions division

Beverage & Brewery Water Refinery and Energy Factory

A closed loop solution

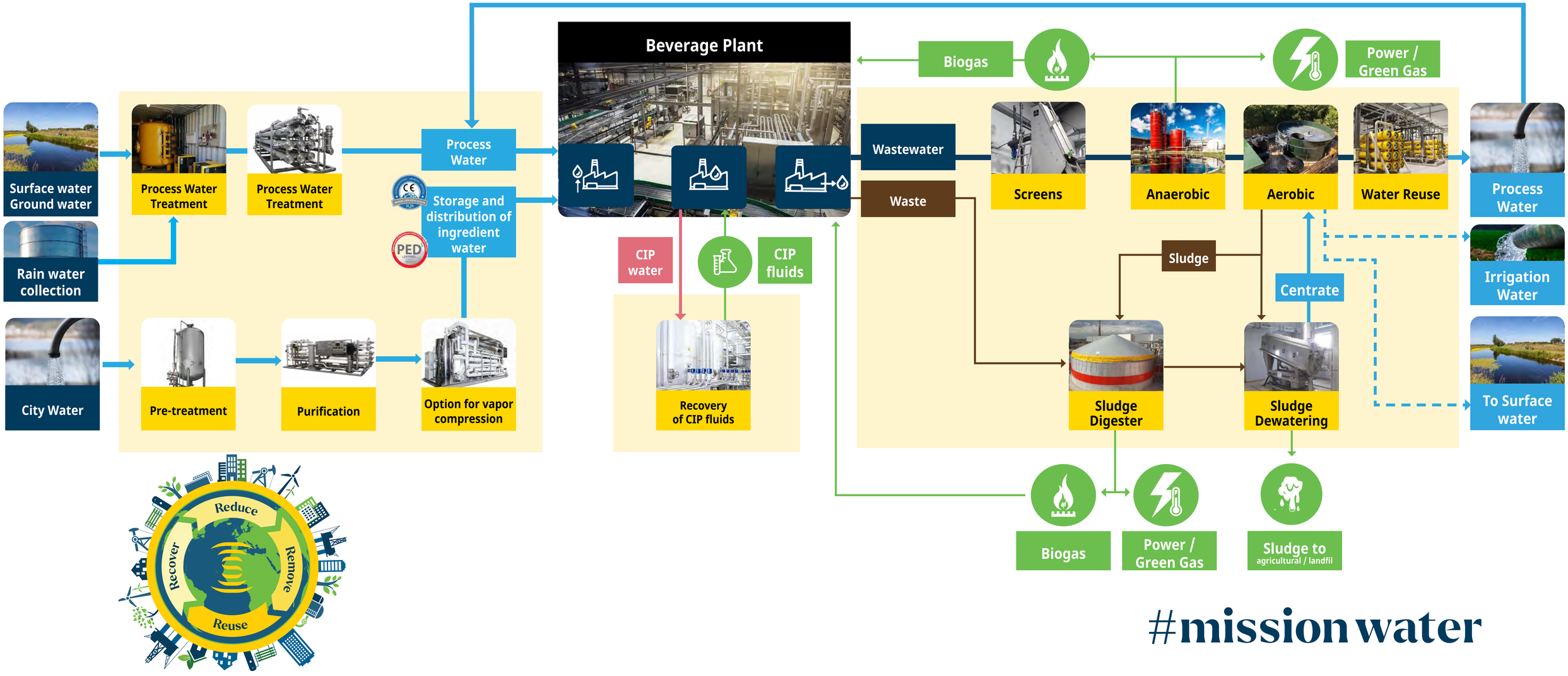
Reduce cost, energy and water consumption per bottle with a closed loop concept

Environmental compliance | closed loop to reduce water intake | guarantee of water and energy, avoid production stops | improving performance | improving efficiency | capacity increase | improving water quality | recover power / green gas | reuse process water | reduce sludge | minimize local water scarcity risk

Beverage industry expertise

+400 project references by the following Saur Industrial Water Solutions division companies:

- nijhuis
- econvert
- aqua-chem
- flootech



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A selection out of our +400 beverage and brewery project references

aqua-chem

US Bottled Water Company - Ingredient Water

By utilizing low energy membranes and designing with an eye on increased recovery, the Aqua-Chem units deliver (3) 450 GPM Reverse Osmosis Skids with recovery rates well beyond what was once standard (80% RR) to deliver significant OPEX savings.

aqua-chem

Industry leading bottler - Water Generation

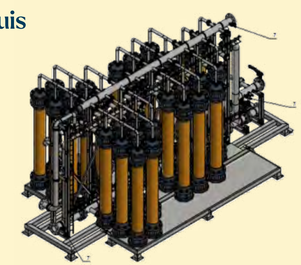
Aqua-Chem worked with the customer to identify opportunities to increase efficiency of existing equipment and design new equipment that would provide additional capacity to support the sites overall water generation demand

aqua-chem

Asian Brewery Company - Premium water purification

An Asian Brewery copacker was looking for a premium water purification method to add to their expanding facility. Their focus was on comparing Aqua-Chem with a competitor that provides vertical vapor compression distillation equipment. Total OPEX cost was the deciding factor, so an in-depth cost comparison of Aqua-Chem's BR6000 to the competitor's 6000 gph vertical vapor compression distillation system was analyzed.

nijhuis



UK Distillery company - CIP Recovery Business Case

A business case has been developed for an UK distillery company, aiming to recover as much of CIP fluids possible. By placing a 10 m^3/h CIP recovery unit, around 70% of CIP fluids can be recovered, with an annual saving of around EUR 600.000 per year and ROI in two years.

A selection out of our +400 beverage and brewery project references

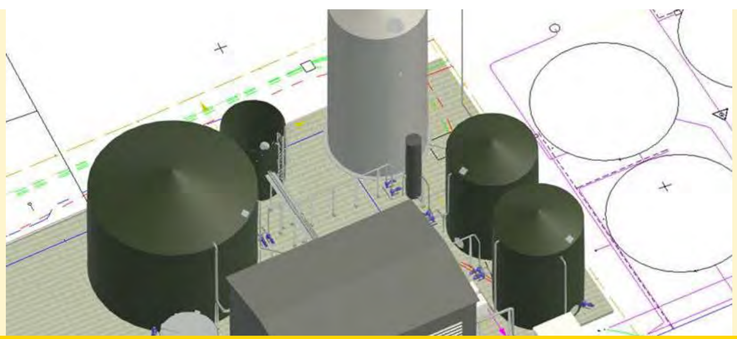
nijhuis

Sharps Brewery, UK - Wastewater and Anaerobic Treatment

Design Flow: 300 m³/d | Delivery: DBO&M of Filter, flocculation-flotation, anaerobic UASB treatment plant, flash aeration | Application: Wastewater treatment to Biogas for heat and power for site | Project start-date: 2013

nijhuis

econvert



Multinational soda company, UK - Wastewater and Anaerobic Treatment

Design Flow: 200 m³/d | Solution: anaerobic wastewater treatment project and energy recovery, including operation and maintenanceDesign flow: 1000 m³/d | Start date: 2021

econvert

Brewery Company Montenegro - Anaerobic Treatment

Design Flow: 1500 m³/d
Delivery: Design, delivery, construction and start-up ECONVERT - IR®
COD: 4000 kg/day | Biogas: 500 - 1400 m³ biogas/d

econvert

Dairy and Alcohol company in the Netherlands - Anaerobic Treatment

Type of wastewater: alcoholic mixes, dairy / fruit juicy and extracts
Delivery: Design, delivery, construction and start-up ECONVERT - EGSB® + biogas treatment
COD: 2.500 kg COD / d | Biogas: 100 m³ biogas/d

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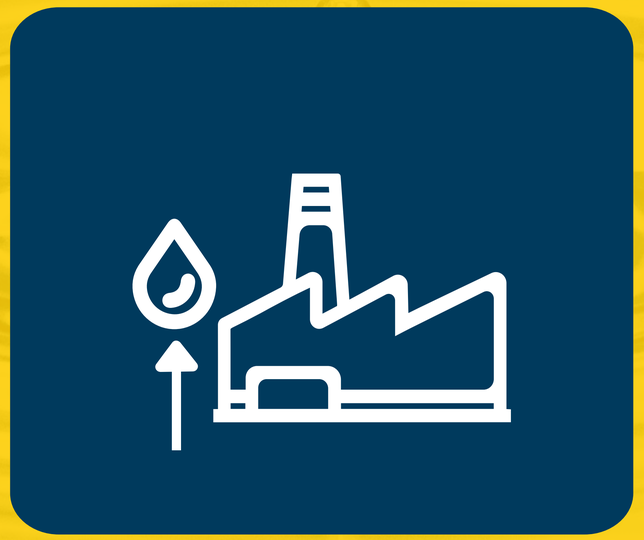
Ingredient and Process Water Treatment



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Beverage Water Room

Turnkey Water Room Design / Supply

Product Overview

Integrated Systems

Pump Skids, Single, Duplex, etc.

Heating and Cooling Skids

Custom Designed Skids for Ozone and UV Disinfection

Water Purification Pretreatment Skids

Media Filtration (Multi-Media and Carbon)

Softeners

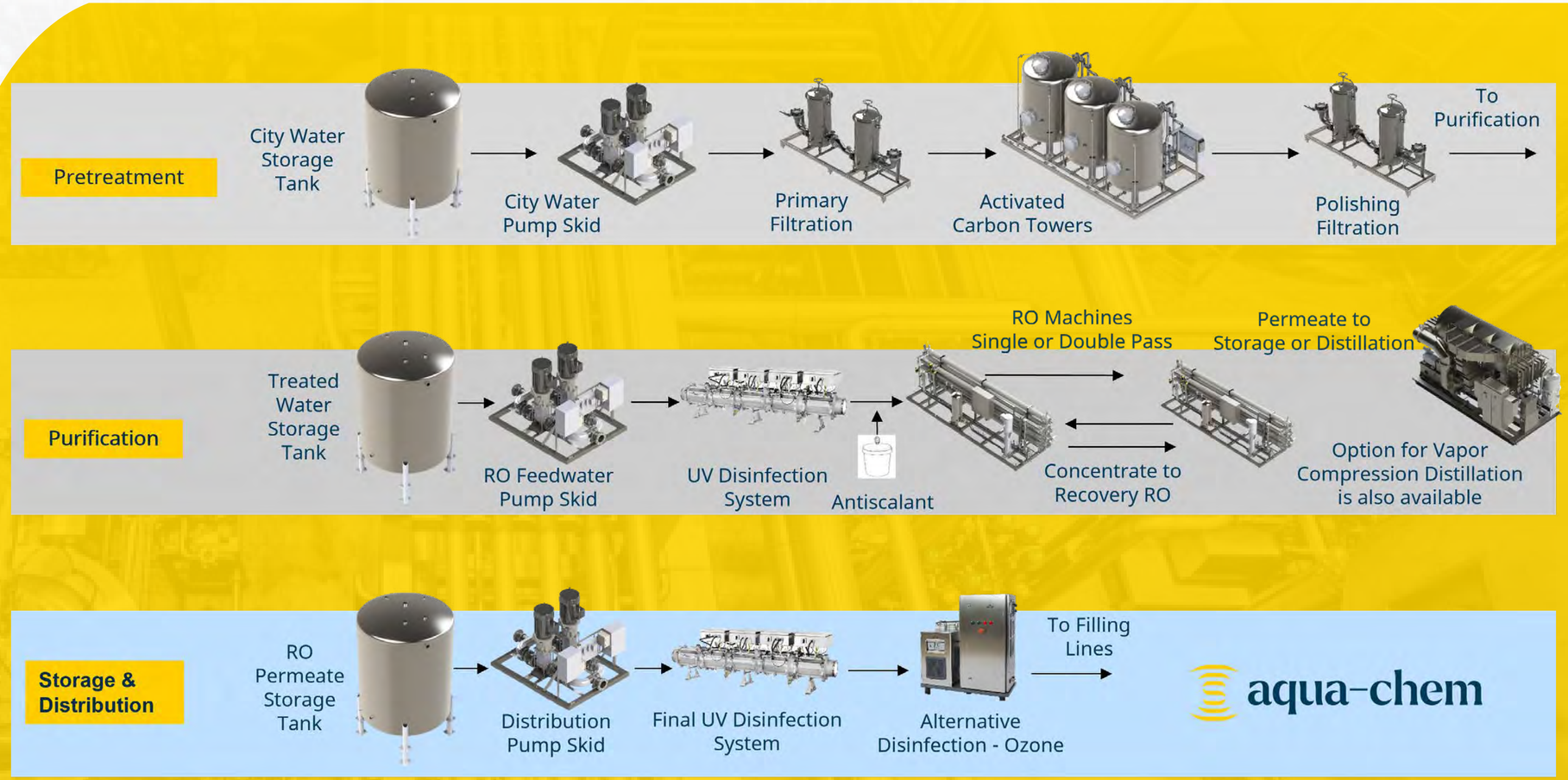
Cartridge and Bag Filters

Pressure Boosting Pump Skids

Water Purification

Beverage Vapor Compression Distiller (200 – 9000 GPH) Drinking Water, CPAP, Laboratory

Beverage Reverse Osmosis (75 – 500



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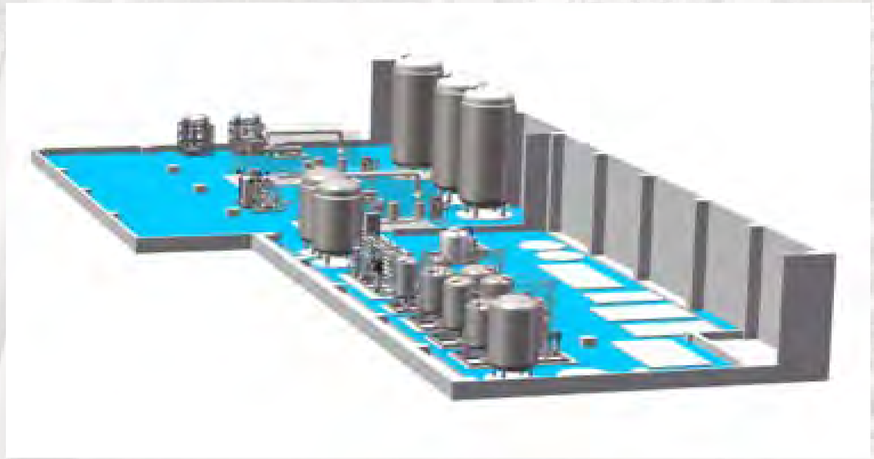
Beverage Water Room

Turnkey Water Room Design / Supply

Aqua-Chem designs and builds complete Water Rooms for bottling plants that utilize standard designed equipment, including high-efficiency reverse osmosis systems, carbon towers, and distillation.

Our integrated approach is geared towards speed to market and low total cost of ownership.

- Water Analysis
- Needed Quantity and Quality of Water
- Required Treatment Steps
- Storage and Distribution
- System Integration



Complete Water Room Solutions for bottling plants, beverage manufacturers, and breweries.

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Activated Carbon Filtration

BCT- Series Carbon Towers

- Premium, stainless-steel construction designed for sanitary environments, no threaded connections.
- Superior experience and craftsmanship through high-quality materials and the best welding and passivation procedures and standards.
- Reduced lead times, competitive pricing, and full-lifecycle support via vertical integration.
- Valuable Options for different Carbon Vendors, Automation, Steam or Hot Water Sanitization, Electropolishing, and Redundancy.

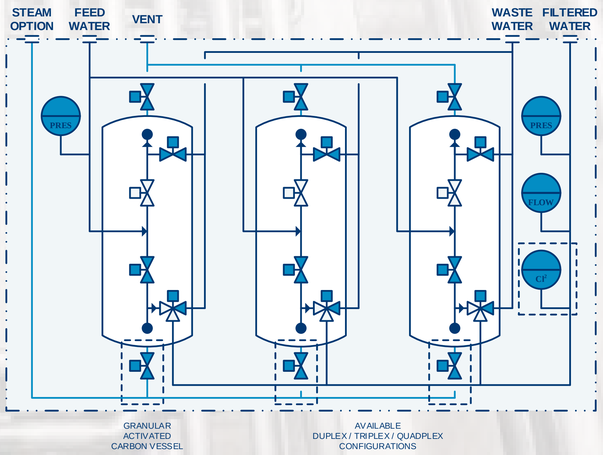
Benefits

1. **Safely remove color, taste, odors, and other impurities via adsorption**

2. **Effective removal of chlorine and chloramines**

3. **Protect downstream equipment**

4. **Activated carbon is low-risk, robust, and requires little**



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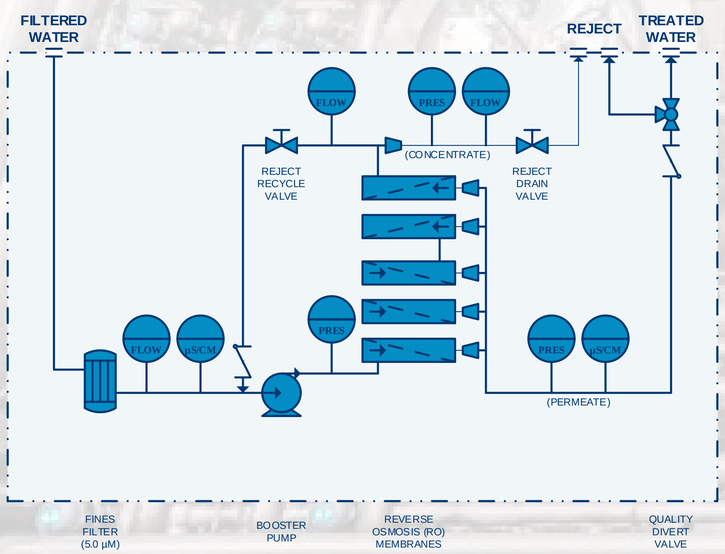
Reverse Osmosis Filtration

Beverage Series RO Skids

- Premium, stainless-steel construction designed for sanitary production environments.
- Smart form factor emphasizes ergonomics, easy maintenance, and installation.
- Flexible options for configuration and membranes and component suppliers to optimize system for:
  - ✓ Inventory / Spares Management
  - ✓ Water Recovery (Utilization)
  - ✓ Salt Rejection (Quality)
  - ✓ Energy Efficiency and OPEX
  - ✓ High Fouling Water Sources



Benefits

1. Reverse Osmosis removes impurities down to the ionic level

2. Pretreatment and Polishing processes integrated into one system

3. Single and Double Pass arrangements are available

4. **Designed with easily accessible major components for maintenance and calibration activities**

5. **High-Recovery Options available to include brine recovery**

Return to plant overview

Vapor Compression Distillation

BR- Beverage Series Distillers

- Patented Horizontal Spray Film® and direct-drive technologies increase reliability and decrease overall size.
- Thermally efficient process recycles a high percentage of latent heat, saving energy and operating costs.
- Industry leading delivery lead time and equipment warranty.
- Robust performance and minimal pretreatment requirements, many systems have been in service for over 20 years with minimal maintenance.

Benefits

1.Less stringent feedwater requirements compared to other purification processes.

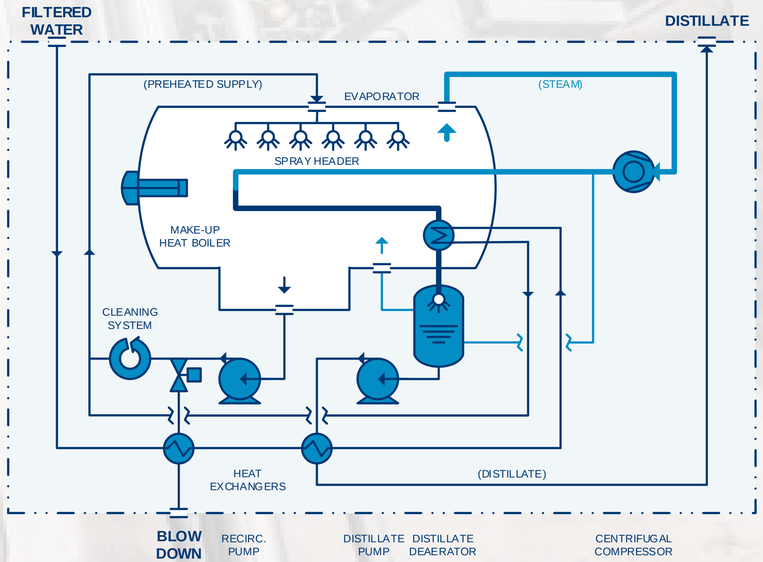
2. **Fully automatic operation requires minimal operator input**

3. Horizontal Spray Film design recycles latent heat energy, making our distillers more energy efficient

4. **All critical components, including the compressor, are above the frame and on the edge of the skid for easy maintenance access.**

5. **Designed with easily accessible major components for maintenance and calibration activities**

6. **Flexible power source options include steam, electric, or a combination of both.**



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CIP Recovery

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CIP Recovery

Advanced ecologial cleaning in place to recover and Reuse CIP liquid

Integrated process solutions to recover resources are crucial to achieve the increasingly demanding environmental requirements to create a more sustainable way of operating industrial plants, which require cleaning in place.

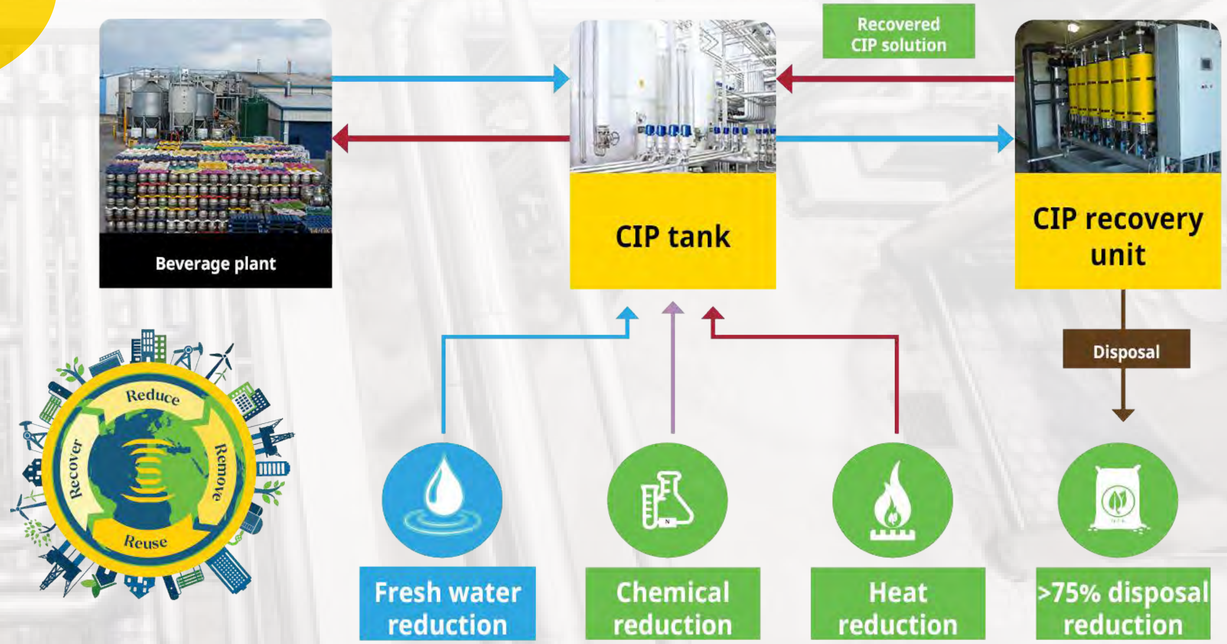
The Nijhuis AECO-CIP recovery unit is a plug & play packaged recovery system to treat spent CIP solutions (i.e. hot soda based).

While the CIP agents and heat remains in the recovered stream, the organic fouling, solids and part of the inorganic soluble content will be captured by special membranes and concentrated prior to disposal.

The system can be applied for both caustic, acid and enzymatic CIP solutions. Typical hydraulic recovery of 75 to 90% can be achieved.

Benefits

1. **Recover CIP solutions** by membrane cleaning
2. **Low energy consumption**
3. **Reduce waste disposal costs**
4. **Retain CIP-energy** by smart integration of heat exchangers
5. **Reduced fresh make up water**, chemicals and heat
6. **Increased CIP availability** by shortened preparation times



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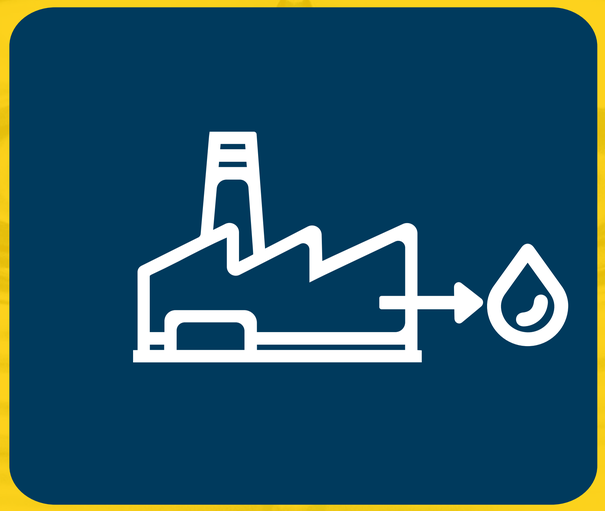
Wastewater, Anaerobic and Water Reuse Treatment



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Screens

Primary treatment – Seperate large particals from wastewater

Filter systems are used as primary screening to separate large particles from your wastewater. Removal of these particles prevents downstream pipe blockages and protects upstream equipment.

Our solutions

Aquarake, type NPS
The Aquarake is a self-cleaning channel filter, with an endless belt of filter elements, which will transport and discharge the retained solids. Hot water spray system and brush cleaning are optional items on the screen.

Curved screen, type NZB
The curved screen is a straightforward static filter, equipped with a wedge wire sieving plate. A pneumatic controlled sparing system installed with cover will clean the curved screen periodically.

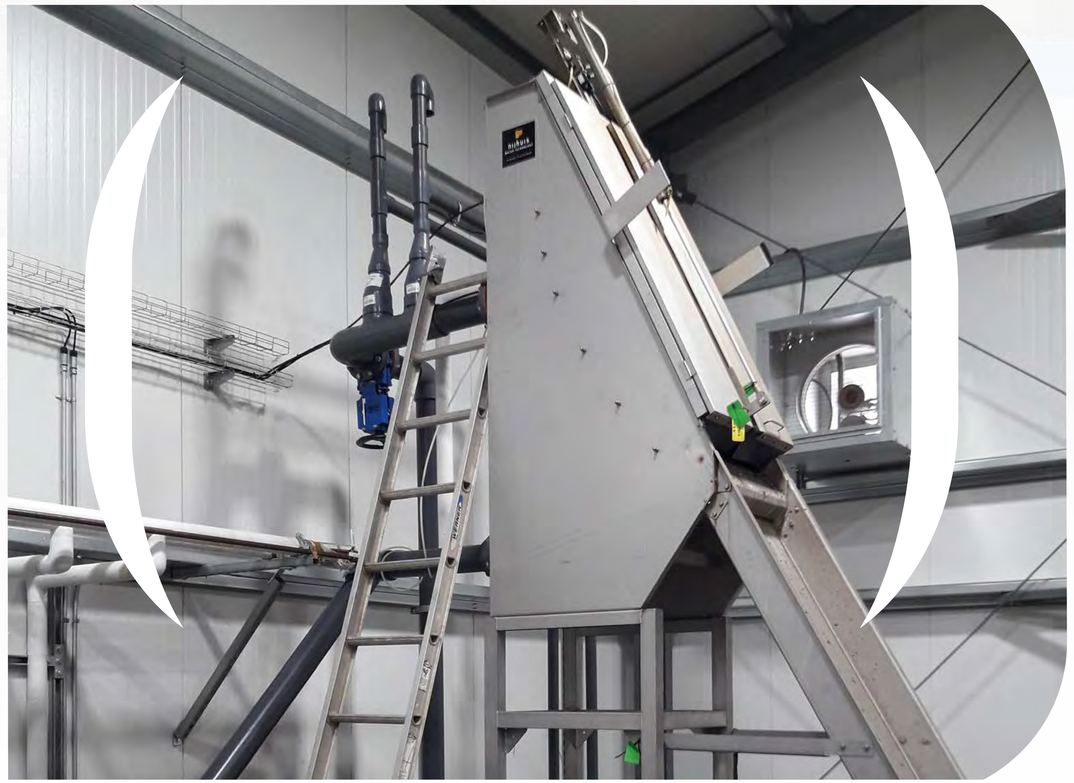
Rotary drum screen, type NTF
The internally fed rotary drum screen is equipped with a patented inlet water distribution system. A perforated drum with screw will retain and transport the solids from the wastewater. An overflow system is standard.

Rotary drum screen, type NRF
The externally fed rotary drum screen with a self cleaning wedge wire drum will retain solids from the wastewater. An adjustable overflow weir and spraying systems for periodically cleaning are integrated in the design.

Rotary drum screen, type NDF
The cloth filter is an inside fed rotary drum screen with a perforated drum covered by a cloth, specially designed for removal of fine solids. Suitable for specific applications for example solid/liquid separation of manure.

Benefits

1. Fully self-cleaning.
2. Completely pre-assembled.
3. Corrosion resistant materials or durable coated steel.
4. No electrical / motor parts below water level.
5. Wide selection of sizes available.
6. Standard range or tailor made.
7. Low power and utility requirements.
8. Easy to maintain.
9. Easy replacement of filter elements.



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Anaerobic Treatment

Reduce carbon and water footprint, recover energy and improve operational sustainability

The future of energy production is in many ways a real brain teaser for the highest educated scientists. While water comes with a relatively moderate cost, energy prices are already skyrocketing. A way out of the energy production crisis and CO2 reduction requirements is the anaerobic digestion of wastewater. Anaerobic wastewater treatment has been widely implemented but it was never seen as the next big renewable.

Benefits

1.High return on investment

2. Up to 90% savings on discharge costs

3. Low operational costs and low maintenance

4. Conversion of wastewater into renewable energy

5. No sludge discharge costs

6. Reduction of CO2 footprint

7. Good possibilities for water reuse in factories

8. Quick start-up

9. Economically appealing at COD loads starting from 300 kg per day.

Why anaerobic solutions from Nijhuis Saur Industries and Anaerobic expert Econvert?

1. Maximise performance / avoid production stops / meet environmental compliance.
2. Reduce water, carbon, and environmental footprint of your plant: a smart combination of incoming and outgoing water streams.
3. A smart system to fit into the available plot of the plant.
4. Experienced support for high-tech plants to help your local operator or outsource it to Nijhuis Saur Industries and Anaerobic expert Econvert.

Return to plant overview

Anaerobic Treatment

Depending on the application, anaerobic solutions can be applied to several types of industrial wastewater.

Food, Beverage, Dairy, Municipal and Heavy Industries contain several contaminants which are suitable to remove COD and generate electricity from the wastewater.

UASB solution (Econvert-UASB®)

The Econvert-UASB® is proven for decades and never fully replaced.

The robust configuration enables the handling of large varieties in both volume and composition.

EGSB solution (Econvert-EGSB®)

Econvert-EGSB® is the optimized compromise, combining a small footprint with less internals. The unique settling system of the reactor has proven to retain solids also in high flow.

IR solution (Econvert-IR®)

Econvert-IR® - The high performer. Designed to create the ideal process conditions. The two-stage settling system enables internal recirculation. Due to this high COD concentrations can be treated and optimum biological conditions are secured.

Dsulph solution (Econvert-Dsulph®)

Econvert-Dsulph® is the perfect blend of biology and chemistry. Biogas typically contains H2S, a component harmful to you and your equipment. This desulphurization unit combines the chemical absorption of H2S in the scrubber with the biological recovery of elemental sulphur in the bioreactor

Return to plant overview

Aerobic Treatment

Remove dissolved materials from wastewater

Aerobic treatment systems is based on a biological process operated and controlled under aerobic conditions (with aeration) that effectively treats COD, BOD and VSS into water, carbon dioxide and new biomass. Our aerobic treatment experts have vast experience and know-how to properly select, design, build and operate aerobic processes providing clients with the best treatment solution that is sustainable with the lowest cost of ownership.

Our Bioctor solutions come in a variety of proven options allowing us to offer the best for a customer application. Whether you are interested in separation of your wastewater with membrane technology, flexible tank operations, need to reduce industrial wastewater pollutant load to very low effluent requirements, or treat industrial wastewater for water recycling, Nijhuis can incorporate the proper Bioctor technical approach, applied to a mixture of substances in the wastewater.

Customer benefits

- Flexible selection of BIOCTOR solution, depending on your require-ments.
- Flexible selection of surface or bottom aeration.
- High removal rates of BOD and VSS greatly reducing surcharge costs.
- Proven Nijhuis experience of applications in several industries.
- FLEX-AERATION solution, innovative fine-bubble aeration system to re-duce installation costs for the piping grid.

Applications

- Convenience and food processing
- Fish, meat and poultry processing
- Soft drink and beverage producers
- Potato and crisps processing
- Breweries, distilleries and wineries
- Dairy processing
- Edible oil processing

View our complete Aerobic Treatment portfolio

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Aerobic Treatment

Remove dissolved materials from wastewater

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Sequence Batch Reactor, type Bioctor-SBR:
The Nijhuis BIOCTOR-SBR is an easy and flexible to operate single tank solution. All operations required in the process take place in one Sequence Batch Reactor tank. Consisting of a selector tank and aeration/ denitrification tank, the proven technology has a very small footprint in comparison with the continuous biological systems. The BIOCTOR-SBR can be executed with surface or bottom aeration.

Membrane Bioreactor, type Bioctor-MBR:
The Nijhuis BIOCTOR-MBR is a continuous sludge water separation by membranes, using flat plate or hollow fibre membrane modules and can be installed either in the aeration tank or in a separate membrane tank. Consisting of a selector tank and bottom aeration/denitrification tank, the solution can reach very low effluent discharge values and has no sludge return flow.

Moving Bed Bioreactor, type Bioctor-FlooBed®:
The Nijhuis BIOCTOR-MBBR is using carrier material to have a more effective growth of bacteria, whereby a compacter aeration reactor can be used. The solution is easy to maintain and has flexible upgrade possibilities. In case there is a strict suspended solids discharge limit, a flocculation-flotation system will be included to remove the solids.

Continuous reactor, type Bioctor-CONTINUOUS:
The Nijhuis BIOCTOR-CONTINUOUS is a 24/7 system where water flows by gravity through the required steps of treatment, with a clarifier or DAF for sludge and water separation. Compared to the traditional clarifier, using a DAF for sludge and water separation, makes the biological reactor more compact since a higher concentration of bacteria in the aeration tank can be maintained and a better effluent can be guaranteed.

Consisting of a selector tank and aeration/denitrification tank, the system is suitable for high flows. The BIOCTOR-CONTINUOUS can be executed with surface or bottom aeration.

FLEX-AERATION system:
We offer a wide range of surface and bottom aeration solutions for aerobic biological treatment, Nijhuis FLEX-AERATION, resulting in flexible and custom-made configurations which we design, realize and maintain. For surface aeration we offer Low Speed and High Speed aerators. For bottom aeration we offer Fine Bubble and Coarse Bubble aeration systems with tubes or discs.

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Water reuse and recycle solutions

Reduce water footprint, lower operating costs and improve operational sustainability.

Freshwater sources in several regions around the world are running out or will run out. Water is necessary to secure an improved quality of life due to the impact of climate change and other environmental issues. However, in a future world wherein the water sector delivers ‘Water-on-Demand’ solutions, in combination with new technologies and new business models, the balance between demand and supply should be in harmony.

Why consider water reuse?

- Production limitations due to water shortage
- Meet Corporate Social Responsibility goals to reduce the water footprint
- Reduce water disposal costs and/or meet effluent disposal limits
- Reduce the impact of drought by reusing sewage wastewater
- Decentralised circular water management for residential areas

Our Solutions

Bioctor-MBR
A sludge water separation system by membranes, using flat plate or hollow fibre membranes modules for wastewater. This can be part of tertiary treatment, start of pre-treatment for the membranes including CIP and flush water recovery.

NMS-UF - Ultrafiltration
This unit is a superior barrier for viruses and bacteria removal and a solid pre-treatment for reverse osmosis.

NMS-dNF - Direct Nanofiltration
This step is considered the finest step, combining two steps together: ultra and micro filtration. This unit can be implemented to remove colour, bacteria and viruses for drinking water and wastewater applications.

NMS-RO - Reverse Osmosis
This is the last membrane step before disinfection for producing e.g. drinking water. The unit removes dissolved components, such as ions, heavy metals, TOC and viruses.

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Sludge Digestion - AECOMIX™–Taurus

Digestion systems for manure and co-products

We design and supply manure and co-digestion systems, the Taurus reactor. Under anaerobic circumstances agriculture wastes and organic substances are digested into biogas and a digestate. The feed into the process could consist of: Manure of animals, Agricultural wastes, Food factory wastes, and Co-substrates, like maize, corn, grass and sugar beets.

Depending on the available raw materials, we awill design the optimal system. This system can include the following steps: raw material storage, raw material preparation, balancing, digester including mixing system, biogas conditioning and usage, digested solids separation and processing and digestate treatment.

Benefits

- Energy in a biogas plant is carbon neutral.
- Biogas and energy can be produced 24/7.
- Closed systems, low environmental smells.
- Low dependence on energy from the public net and import from oth-ercountries.
- Energy generation is not directly depending on wind, water and sun-conditions.
- Biogas can be stored.
- Fertilizer value of manure is improved by the biogas process.

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Sludge Management

Cost-effective sludge dewatering solutions

With its longstanding industrial experience, Nijhuis Industries has developed a cost-effective screw press system (NSP) to dewater sludge without high fibers or abrasive solids, including, both physical-chemical biological types of sludge. Sludge dewatering treatment with NSP effectively generates dewatered cake with high dry solids content and a good quality of centrate water, resulting in significant sludge volume reduction. Hence, costs associated with sludge disposal will be minimized.

Benefits

- Cost-effective & flexible sludge dewatering solution
- No pre-dewatering needed
- Dewatered cake 20 +-5% DS for physical-chemical sludge, 16 +-3% DS for aerobic biological sludge
- Solids capture of more than 95%, reducing filtrate treatment cost
- Automatic washing system, reducing operational downtime
- Adaptable to different sludge types
- Small footprint
- Little metallic wear and tear.
- Low energy consumption and low noise
- Low maintenance

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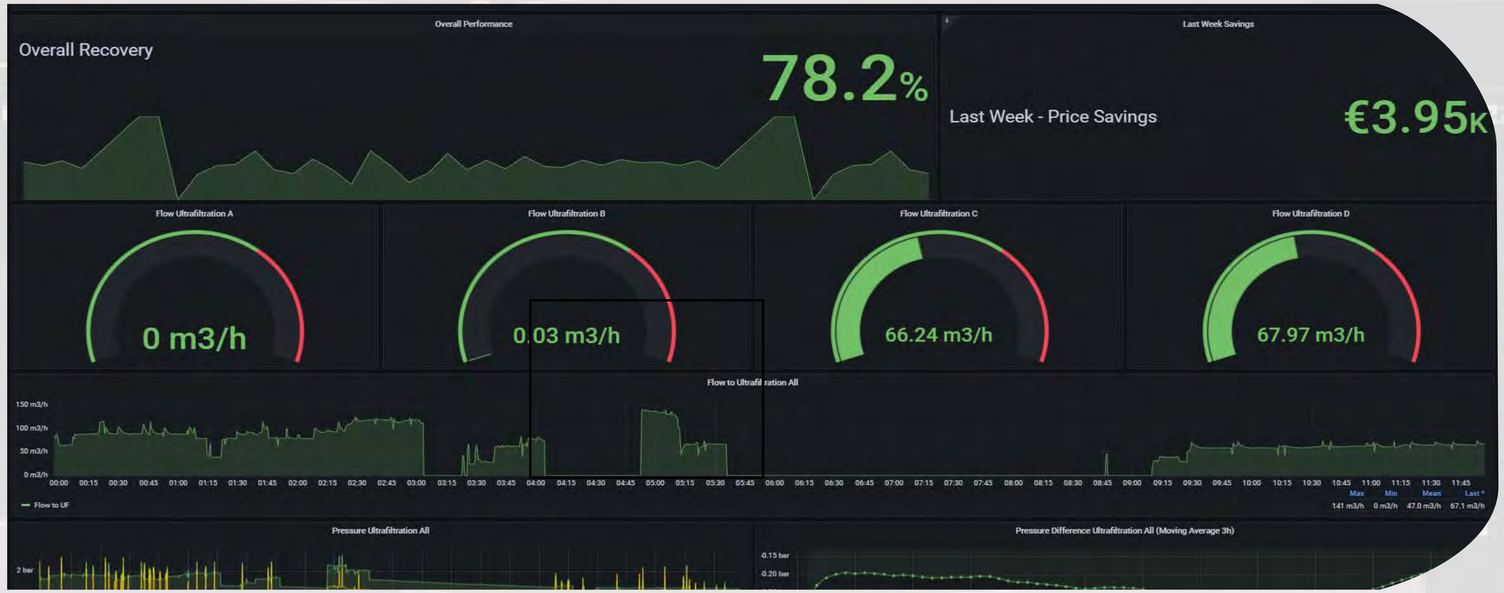
i-MONITORING & i-CONTROL

The Nijhuis i-MONITORING & i-CONTROL program is a true intelligent service with a ROI based on the current or expected OPEX of the system. To reduce the life-cycle cost of your plant and extend the lifetime we provide a complete management of your installation through 24 / 7 monitoring, which is facilitated from our monitoring center in Doetinchem, the Netherlands. Our i-MONITORING & i-CONTROL program is a preventive method to control the number of installation issues. Your installation will be monitored 24/7 with real-time acces to your system.

Customer benefits

1. Reduce personnel cost
2. Reduce maintenance costs
3. Reduce chemical and power consumption
4. Reduce the involvement of staff
5. Improve and guarantee effluent quality
6. Control and manage the installation



Scan the QR codes to go to our i-MONITORING dashboard

Dissolved Air flotation

Rental solutions

Water reuse solution