



Environmental protection means cost savings

Wastewater purification

Welcome to the Future together with QWAIR

At QWAIR our focus is on saving the environment and reducing costs. We want to contribute in terms of environmental protection. To give you an understanding of our values, we have defined our mission and vision. Our vision is the reason why we do our work. Our mission shows the direction in which we are moving in order to be able to achieve our goals.

Vision

Our daily work is to develop sustainable solutions to protect the environment and the well-being of people.

Mission

We interlink production processes with our technology to purify wastewater and exhaust air – efficiently and economically! We extract and recycle the valuable substances.



Environmental protection means cost savings

Three guiding principles define our understanding of responsibility and form the basis for our solutions:

Raising awareness for limited resources

Raw materials and energy are important resources during the production and use of products. Their efficient use minimizes environmental impact, strengthens competitiveness and ensures sustainable growth. Our position is to use intelligent solutions where production, processing, treatment and energy management are interlinked in a meaningful way.

Trusting progress

Innovative technologies based on resource-saving production are the force that drives us. This is why we trust in the power of progress.

Assuming responsibility for the environment and people

Limited resources and climate friendly production. Effective and sustainable solutions can only be achieved in partnership with other stakeholders. We call this: „Solutions out of responsibility“. This is why we stand for sustainable production cycles.

Wastewater Treatment is our business

Disposal of wastewater will become more and more difficult and expensive. Through the recovery and recycling of materials, tremendous savings can be achieved. At QWAIR, environmental protection saves costs.

Our unique and patented **waterwin®-Technology** is a key component for closing the gap in the water cycle and material recycling. In comparison with other common technologies like membrane techniques, the liquid can be concentrated **up to 80 % higher**. At the same time, **energy consumption is only at 50 %** of a conventional evaporator.

Determination of process data

Inquiry

Measuring / Tests

Concept

Proposal

Execution

Service



waterwin®-Technology

Evaporation instead of vaporizing

The **waterwin®-technology** is a thermal process with excellent separation performance and the greatest possible concentration of the residues. Existing heat is used to achieve an efficient energy balance. In comparison to conventional evaporators, the **waterwin®-evaporator** is operated under ambient pressure and temperatures of below 85 °C. This increases the process stability and allows a design in plastic.

How the evaporator works

A rotating brush is the heart of the evaporator. The brush is exposed to the wastewater. The bristles of the brush create a high surface area for evaporation and the rotation itself creates a turbulence.

The water evaporates and the ingredients are kept in the liquid. The liquid continues to concentrate until a certain concentration is reached. Then the concentrate is drained.

Air flows constantly through the evaporator from the bottom to the top. The air acts as a transport media for the evaporated water.

The evaporated water is fed into a condenser by means of air flow. Here the air is cooled down and the contained water is condensed and can be recovered as pure liquid water. The released heat during condensation is taken to heat up the wastewater (feed).



Maximum Efficiency

- Reuse of the purified water (closing the water cycle)
- Minimum disposal cost by maximum concentration of the wastewater
 - Recycling of reusable materials possible

Excellent Energy Balance

- Integrated energy recycling
- Use of existing heat possible / smooth integration of existing processes
 - Optimum choice of energy supply by our energy experts

Minimum Supervision

- Fully automatic operation
- Communication via control room
- Minimum maintenance
- Robust design and high quality components

High Operational Security

- No corrosion
- No pressure vessels (operation at atmospheric pressure)
- No sensitive components like vapor compressors
- Suitable for highly fluctuating wastewater compositions

Link to the process video



Process water

During generation of process water, the quality has to be adapted to the requirements of the customer. The different local conditions necessitate a high degree of flexibility in the choice of suitable processes for pretreatment and preparation.

Based on the parameter of the feed water, a reliable process is designed by QWAIR which takes the requirements of the process water into account.

Wastewater

The aim of wastewater treatment is to minimize the cost for disposal. Depending on the ingredients and the task, multiple treatment steps are required.

QWAIR develops an individual process concept for you in order to reduce the disposal costs to a minimum and checks whether the following possibilities exist:

- Closing of the water gap: Treatment of the wastewater to be used as process water. Liquid disposals are avoided (MLD/ZLD).
- Recycling of ingredients: valuable ingredients will be concentrated to a maximum to allow efficient recycling.



Techniques and purpose:

Pre-Treatment:

- [Sedimentation and filtration](#) in case of sediments and insoluble ingredients
- [Ultrafiltration](#) in case of organics, emulsions, oil and grease
- [Nanofiltration](#) to remove phosphates and sulfates
- [Reverse osmosis](#) in case of salines
- [Biological treatments](#) to reduce organic or biological ingredients

Thermal separation technique (MLD/ZLD):

- [waterwin®-evaporator](#) for concentration of liquids up to highest viscosities.
- [Crystallization](#) to thicken liquids to stab-proofed sludge/solid.

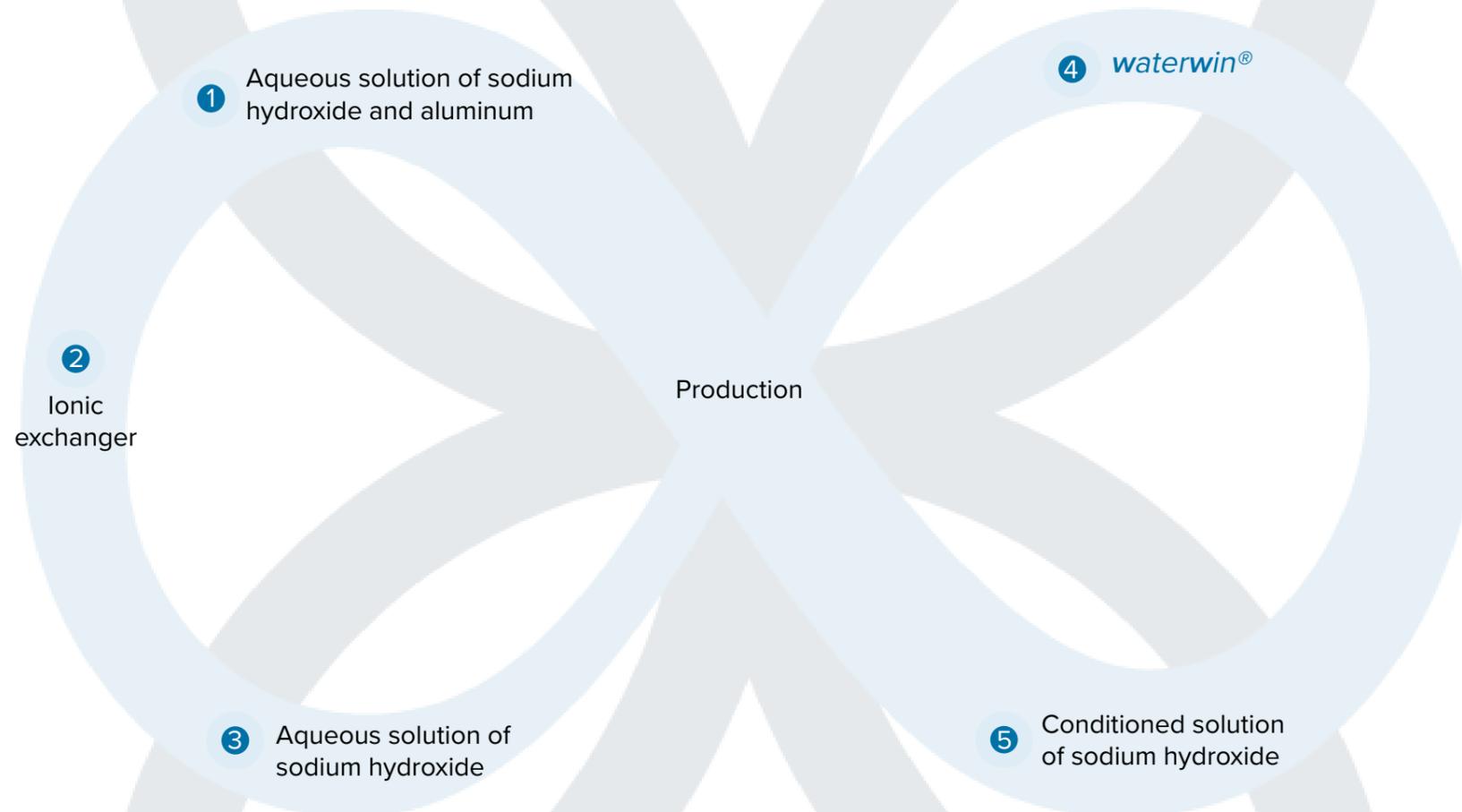
Examples

Acid - Alkali - Management

Recycling of sodium hydroxide:

Process description:

- 1 The solution/water has to be separated from aluminum.
- 2 The solution of water, Al^{3+} and NaOH is relieved from Al^{3+} via ionic exchanger.
- 3 The solution of H_2O and NaOH is too aqueous for reuse in production.
- 4 The water will be separated from the solution by the [waterwin®-technology](#).
- 5 The conditioned NaOH solution can be reused.



Used technologies:

Reduction of metal ions:

- Ionic exchanger
- Retardation
- Nanofiltration

Conditioning of alkali

- [waterwin®-evaporation](#)
- Crystallization

Similar applications:

Semi concentrates / rinsing water - Ingredients:

Metal:

- Aluminium (Al^{3+})
- Copper (Cu^{2+})
- Zinc (Zn^{2+})
- and more

Acid:

- Phosphoric Acid (H_3PO_4)
- Sulfuric Acid (H_2SO_4)
- and more

Alkali:

- Sodium hydroxide (NaOH)
- Potassium hydroxide (KOH)
- and more

Cost effectiveness of **waterwin**[®]

For the mass transfer from liquid to gaseous water, almost the same energy is required. Our plants have a highly efficient energy recovery system as standard, which keeps the energy required for water treatment in the system. For this purpose, the energy required for evaporation is recovered in condensation. A modular system enables individual adaptation to local conditions. In addition, the following advantages are achieved:

50 % less energy
compared to a multiple stage vacuum evaporator

80 % higher concentration
than membrane technologies

95% less efforts for support
than CP technologies

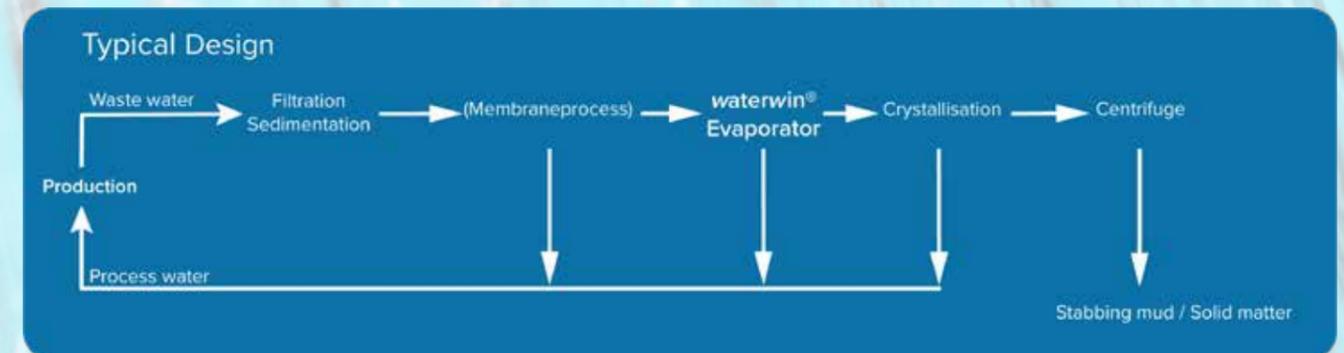
Examples

Production free of wastewater - process combination ZLD:

The closing of the water gap offers the opportunity to reduce costs of the process and at the same time to reduce the amount of wastewater.

Further savings can be achieved in recycling of materials. If recycling is not possible, the ingredients will be concentrated to a maximum to reduce the disposal costs to a minimum. Our combination of different treatments in the entire ZLD process allows a 100 % removal of water from the wastewater. Our unique and patented **waterwin**[®]-technology is the heart of the whole process.

“Compared to a purely thermal ZLD solution, about 30 % of the investment costs can be saved and more than 40 % of the energy costs as well.”



| Technology | Power source | Heating costs |
|--|--------------------|------------------|
| Recycling of waste heat <i>Advantage: No costs for heat generation</i> | On-site waste heat | 0 ct. / kWh |
| Integration of a heat pump <i>Advantage: system can be operated purely electrically, high heat pump efficiency (COP), subsidy possible</i> | Electricity | ca. 5 ct. / kWh |
| Heat supply by a boiler <i>Advantage: Low heat generation costs, high thermal efficiency, simple robust plant technology</i> | Natural gas | ca. 4 ct. / kWh |
| Energy supply by means of CHP (flex) <i>Advantage: Lowest heat generation costs / yield possible, Electricity can be provided almost completely to the customer, subsidies are possible</i> | Natural gas | ca. -5 ct. / kWh |

Advantages:

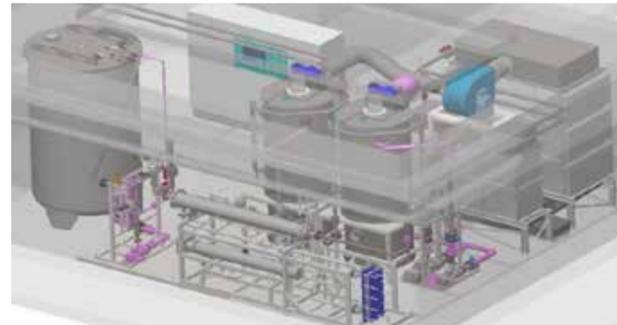
- Recovery of valuable resources
- Reduction of disposal costs
- Improvement of the CO₂ balance
- Reduction of fresh water demand
- Lower investment costs
- Lower energy consumption

waterwin® installations

Tailor made systems for all customer needs



Industry: forging and machining
Wastewater: water + cooling lubricant
Daily input: 13 tons
Target: minimum disposal costs
Speciality: tailor made to fit into a narrow basement



Industries



Automotive Industry / Electroplating Industry / Surface Technology

Contaminated rinsing solutions from rinsing cascades can be treated by evaporation that active ingredients like zinc and nickel alloys can be reused.



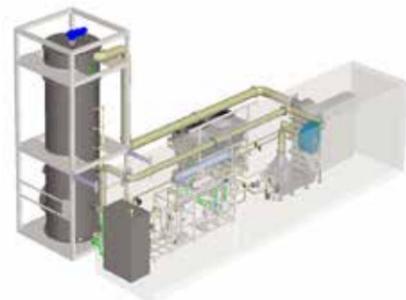
Steel Industry

During machining of steel, cooling lubricants are used to cool, to forge or to draw steel. These emulsions can be reused for the recovery of the oil. Also permeates, distillates and condensates can be recovered in a water-saving way into the cycle.

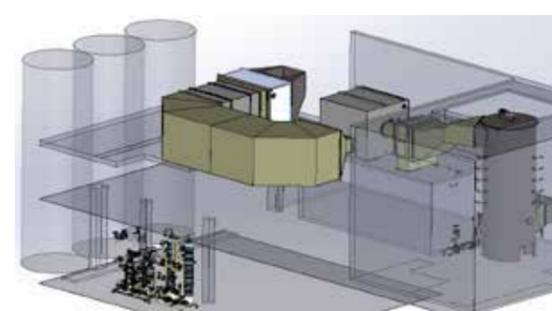


Chemical Industry

Generation of process water from brines and rivers is a common technology. Already used process water can also be treated to reuse it as process water (closing the water cycle).



Industry: industrial park
Wastewater: zinc / nickel
Daily input: 50 tons
Target: closing the water cycle
Speciality: system in container for transport overseas



Industry: circuit board manufacturing
Wastewater: water + copper + sulfuric acid
Daily input: 6 tons
Target: copper recovery
Speciality: no additional heat is required (using 100% of waste heat)



QWAI R GmbH
Frankfurter Str. 8
D-74072 Heilbronn

Fon +49 (0) 7131 79700-00
Mail info@qwair-group.com

Web <https://qwair-group.com>