



ADVANCED WATER SOLUTIONS

BENEFITS

Energy cost Savings: All AquaSwiss RO-GREEN systems are equipped with ERI modules. The DOC module allows for uninterrupted desalination process. Membrane cleaning is performed while the regular desalination continues and pressure is not lost.

Chemicals cost saving: AquaSwiss RO-GREEN is a system which requires no anti-scalant nor cleaning chemicals. Traditional SWRO systems require a large amount of costly chemicals for pretreatment and CIP operations. These cost items are eliminated from the AquaSwiss RO-GREEN operation costs. Taking into consideration the need for chemical storage, chemical transportation, permits and special control equipment, the amount of savings in this section is considerable.

Eco Friendly: The most ecologically friendly desalination technology in the world. With no antiscalant and cleaning chemicals and reduced carbon footprints RO-GREEN is a major step towards eco-friendly desalination.



CONTACT INFORMATION

Engineering Center and Headquarters AquaSwiss AG

Business Tower, Zürcherstrasse 310CH-8500 Frauenfeld, Switzerland.
Ph : +41 52 723 2430, Fax : +41 52 723 2431.
Email : info@aquaswiss.eu

Regional / Representative Offices

Dubai - Regional Office, Ph : +971 4 327 5588, Fax : +971 4 327 5656.
Email : info-dubai@aquaswiss.eu

Oman - Representative office

Ph : +968 92 18 5929, Fax : +968 24 79 0271.
Email : info-oman@aquaswiss.eu

Qatar - Representative office

Ph : +974 66 651403
Email : info@aquaswiss.eu

Kuwait - Representative office

Ph : +965 97 27 0333, Fax : +965 2 398 8629.
Email : info-kuwait@aquaswiss.eu



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www.aquaswiss.eu

SUSTAINABLE WATER PRODUCTION

COMPANY

With seven billion people inhabiting our planet and less than 1% of all the water available as fresh water, it is essential to create alternative processes to replace the natural processes for the supply of drinking water as well as water for industrial purposes

As a leader in desalination technologies and processes, AquaSwiss considers preservation of the environment a key element in the design of our solutions and delivery of projects. We are committed to minimizing both the consumption of natural resources and the generation of waste.

AquaSwiss RO-GREEN

The AquaSwiss RO-GREEN set of products is based, on one hand, on the field proven Reverse Osmosis (RO) technology and, on the other hand, introduces a revolutionary new concept.

Technological Innovations Implemented

- The AquaSwiss RO-GREEN makes environmentally-superior RO desalination technologies practical to deploy for medium-to-large-sized projects.
- The AquaSwiss RO-GREEN plant operation requires no chemicals for pretreatment or desalination when treating non-contaminated Saline Water.
- The AquaSwiss RO-GREEN process is based on the implementation of unique technologies for each stage of the process. This includes:
 - A chemical-free bio-filtration pretreatment process that maintains low SDI while effectively eliminating bio-fouling.
 - A patented RO membrane Direct Osmosis Cleaning (DOC) system, a chemical free system.

The combination of these two innovative modules delivers a highly environmentally-friendly solution for the optimization of product flow, salt rejection, product recovery, and operating and maintenance costs.

This technology is available in a modular format installed in standard steel shell containers or in a skid-mounted configuration. These systems are built for use in various desalination applications to assist our customers in meeting all the requirements and relevant standards and regulations. In addition, these systems help minimize environmental impact, maximize the safety and health of workers, reduce chemical usage and conserve energy.

The systems produce water which complies with the World Health Organization (WHO) standards for drinking water.

TECHNICAL COMPONENTS OF RO GREEN SYSTEM

The key equipment components comprising the AquaSwiss RO-GREEN pretreatment process are as follows:

- **Bio-Flocculators** - The bio-flocculator module removes micro-organisms in the feed water by fostering the growth of an active bio-culture within the pretreatment process. The bio-culture is effective at consuming available nutrients in the feed water upstream of the RO process. Without nutrients, biological activity is suppressed within the feed water entering the RO process thereby minimizing the potential for fouling.
- **Gravity Multi-Media Filters** - Following bio-flocculation, the flocculated feed water enters the gravity multi-media filters. These filters provide mechanical filtration of the feed water for removal of total suspended solids previously flocculated.
- **Filtered Water Tank** - Glass reinforced polyester (GRP) water tanks will be supplied to provide sufficient buffering volume to supply the requested flow to the RO feed pumps and for backwashing of gravity filters with filtrated water and compressed air supplied with the system.
- **Micronic Cartridge Filter** - As a redundant measure, a micronic filtration system is positioned downstream of the multi-media filters. Micronic filtration modules are equipped with inlet, outlet, and drain isolation valves and constructed of corrosion resistant materials.
- **Pumps** - A full set of pumps is provided for the backwash and transfer of the filtrated water to the SWRO section. Due to frictional losses, not all of the pressure (energy) of the brine is transferred to the incoming feed water. For this reason, a booster pump in series with the ERS is added to match the pressure of the remainder of the feed from the intake pumping system in the high pressure common header.
- **Pump Package** - The AquaSwiss RO-GREEN SWRO membrane module contains the following pumping systems:
 - **High Pressure Pump** - Each SWRO membrane module is fed with pressurized water. A horizontal split case high-pressure pump is equipped with a variable frequency drive. It allows the feed pressure to be varied to accommodate variation in temperature and salinity of the water. This minimizes operating power.
 - **Circulation Pump** - Pressurized feed water from the ERS system is fed to SWRO membrane module. A horizontal split case circulation pump, equipped with variable frequency drive which allows the feed pressure to be varied to accommodate variation in SWRO system recovery.



- **Direct Osmotic Cleaning (DOC)** – Direct osmotic cleaning is a unique process acquired by the AquaSwiss Engineering Department. It is a patented process which is able to increase the pressure on the permeate side of the SWRO membrane to a level higher than the net operating pressure (pump gauge pressure-osmotic pressure) on the feed side of the SWRO membrane. As a result, permeate flows in the direct osmosis direction while the system and the HPP pumps keep in operation. This flow washes fouling on the feed side of the membranes. Thus, the source of the fouling can be backwashed from the feed side of the membrane surface and washed away with the SWRO concentrate stream. Direct osmotic cleaning allows an effective means of cleaning the SWRO membranes without the use of chemicals not already present in the feed water as required in conventional SWRO membrane clean-in-place. The direct osmotic cleaning process can be operated with changing frequency according to the specific fouling load.