A steady flow of savings

The AQUA Blue freshwater generator

A fresh look at energy

In today's marine market, every chance to save energy counts. Even the most familiar technologies must be seen in a new light.

This includes freshwater generators, where Alfa Laval has long led the way. Since introducing the concept in 1954, Alfa Laval has worked extensively with both shell-and-tube and plate-based desalination equipment.

Today there's a bright new idea in freshwater generation. With Alfa Laval's unique AQUA technology, key energy requirements of the process are cut in half.

The AQUA story

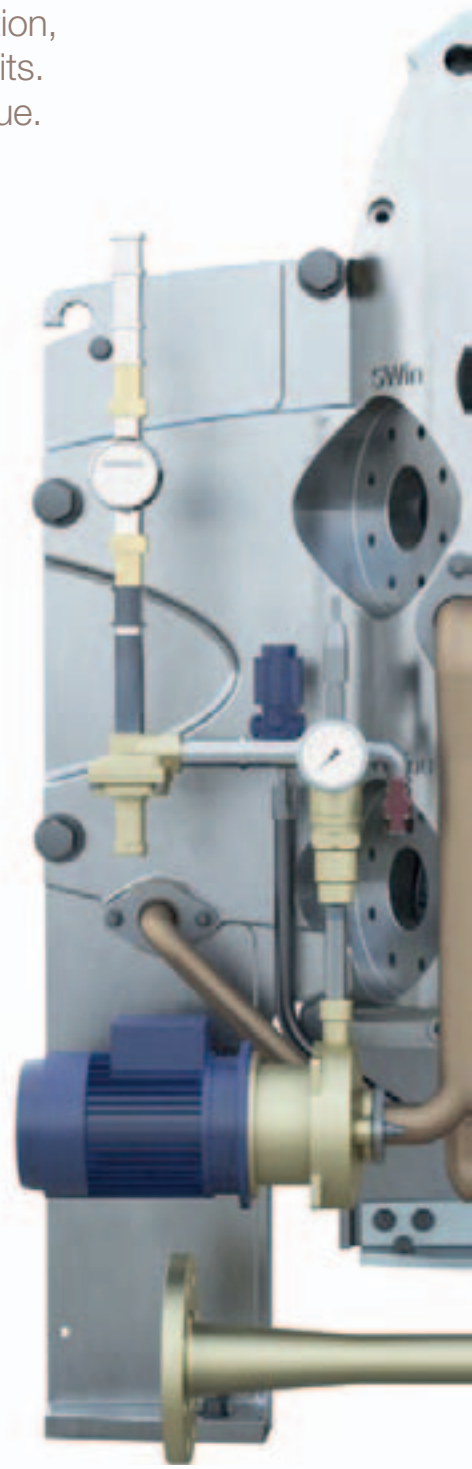
The story of AQUA technology is one of remarkable innovation, combining large energy savings with a range of other benefits. Today the story continues with the introduction of AQUA Blue.

Half the energy use…

In 2008, Alfa Laval introduced the AQUA freshwater generator – and with it today's most energy-efficient desalination process.

AQUA plate technology cuts key energy requirements in half, simply by reducing seawater needs. Utilizing only half the traditional seawater flow, it needs only half the installed pumping capacity. And that means just half the pump-related energy costs.

But the story doesn't stop there. Development continues, and today there's AQUA Blue.



AQUA 2008

continues

…isn’t the whole story

AQUA Blue uses the same energy-efficient technology as its predecessor. Like the original AQUA, it has just one plate pack, comprised of one type of titanium plate.

It still needs only half the seawater, and only half the energy to drive the seawater pumps.

But in AQUA Blue, this pioneering technology is combined with a wide range of new enhancements. These allow even easier installation and maintenance, as well as simpler operation with a better overview of the desalination process.

AQUA Blue 2014

AQUA Blue – ins

The AQUA Blue freshwater generator handles the entire desalination process with a single plate pack and one type of titanium plate. The result is an energy-efficient and easily managed solution.

Serving it all on one plate

AQUA Blue comprises titanium plates with a unique 3-in-1 design. Fitted with two gasket configurations, they allow evaporation, separation and condensation within a single plate pack.

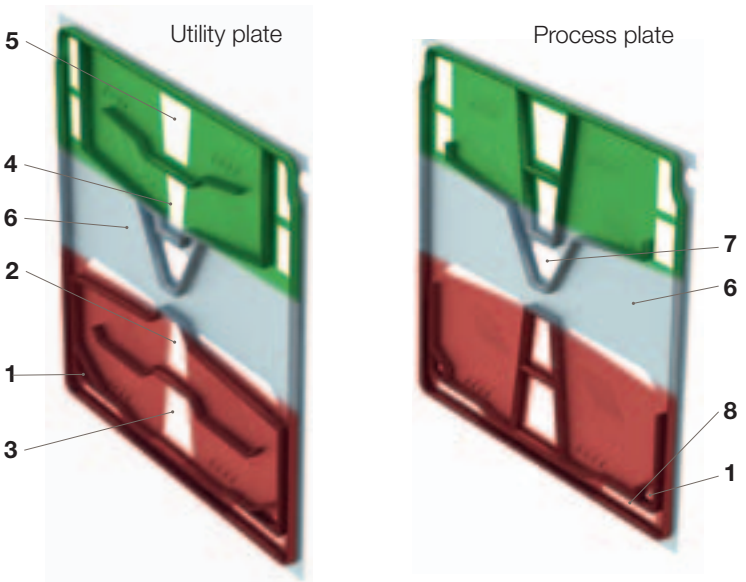
These 3-in-1 plates are the first to be purpose-built for desalination, rather than modified from a heat exchanger design. They combine the best aspects of plate-based and shell-and-tube desalination technologies, drawing on almost 60 years of Alfa Laval experience.

The combination optimizes evaporation and converts more of the feed water into fresh water. So less seawater is needed – along with less energy.

The process in brief

Feed water passes through the lower section of the plate pack, where it is evaporated at 40-60°C in a vacuum of 85-95%. As the vapour rises between the plates, it passes through the separator section, which causes brine to fall into the sump at the bottom of the freshwater generator. Only clean fresh-water vapour reaches the top section, where it is cooled and condensed into fresh water.

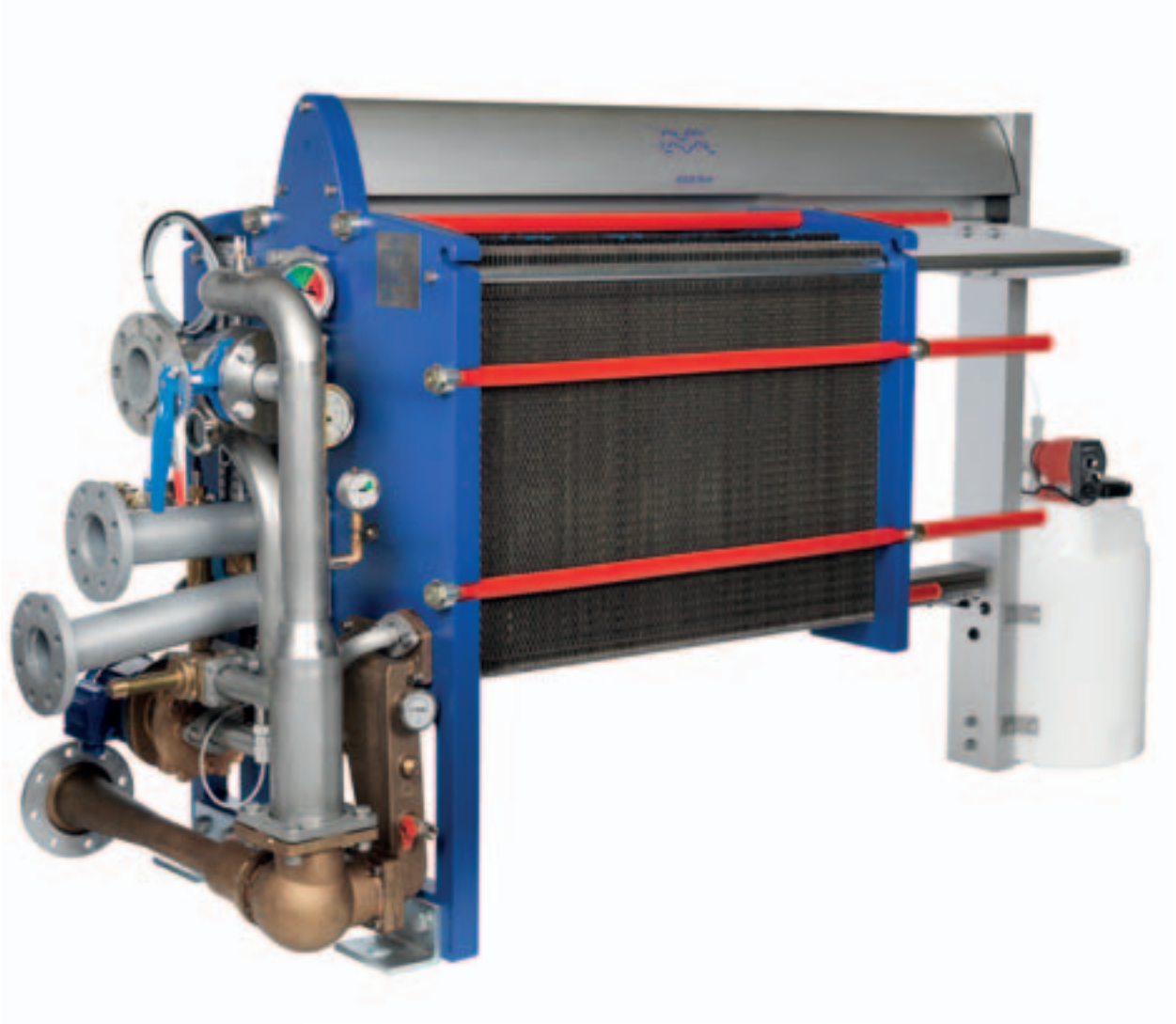
The result is high-quality fresh water with a maximum salinity of 2 ppm. Thanks to optimized flow distribution across the plates, scaling is avoided.



Green Condensation
Grey Separation
Red Evaporation

1 Seawater feed
2 Heating medium in
3 Heating medium out
4 Seawater cooling in
5 Seawater cooling out
6 Evaporated steam
7 Fresh water out
8 Brine out

ide and out



Room to move and grow

Performing desalination in a single plate pack creates a space-saving and easily maintained freshwater generator. Because the process vacuum is inside the plate pack, no outer shell is necessary. The plate pack simply slides open for maintenance, which keeps the service area within the equipment footprint.

The pumps and pipes associated with AQUA Blue can be smaller as well, which simplifies its installation. And if needs should change over time, additional plates can often be added to increase its capacity.

Doing the job wit

The AQUA Blue freshwater generator combines high energy efficiency and high water quality with low maintenance. Together, these advantages result in low lifecycle costs.

Less seawater, energy and impact

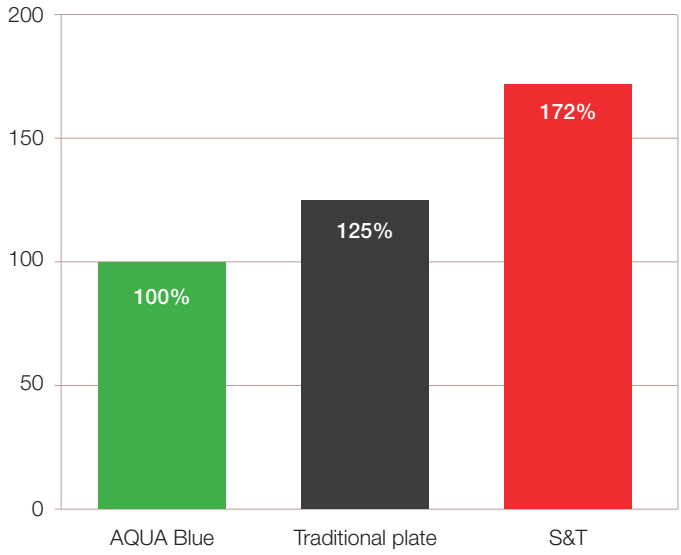
AQUA Blue's optimized technology converts more of the feed water into fresh water. Furthermore, it reduces the seawater used for cooling by half. This means only half the energy is needed for pumping, which is a large portion of the overall energy consumption in generating fresh water.

The difference can be seen in the chart below.

Even over a short time, it means a substantial reduction in operating costs – not only compared to shell-and-tube models, but also compared to other plate-based freshwater generators.

Since energy on board ultimately comes from the burning of fuel, it also means a positive affect on CO_2 emissions.

Proportional energy (kWh) consumption



Comparison based on generating 20 m^3 of fresh water over 24 hours.

th less

Less work and worry

Just as it requires less electrical energy, AQUA Blue demands less energy from the crew. AQUA Blue is designed for peace of mind and start-and-forget operation.

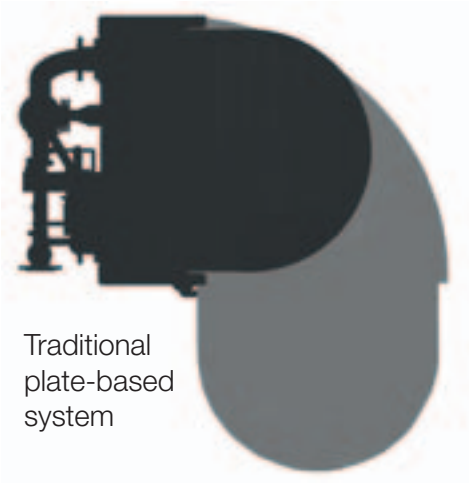
Regulation of the seawater flow optimizes AQUA Blue's performance, ensuring high-quality fresh water with a maximum salinity of 2 ppm. The quality is continuously monitored by the control system, while newly expanded instrumentation offers a clear overview of the process.

When inspection or maintenance is needed, the plate pack simply slides open for easy access to the interior. But the maintenance intervals are long, thanks to optimized flow distribution that minimizes scaling. For the greatest convenience, most scaling can be removed through Cleaning-in-Place (CIP) – without opening the freshwater generator.

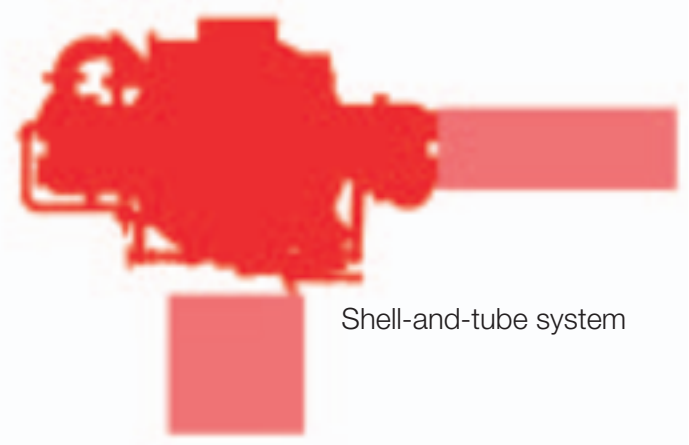
Keeping it simple

AQUA Blue is good news for shipyards, ship owners and ship operators alike. From start to finish, it offers ease, reliability and the global security of working with Alfa Laval.

AQUA Blue



Traditional plate-based system



Shell-and-tube system

Easy to fit or retrofit

Because it cuts seawater needs in half, AQUA Blue can be installed with smaller pumps, smaller pipes and less pipework overall.

Still more space is saved by the equipment itself. AQUA Blue has not only a minimal footprint, but also a service area up to 50% smaller than that of shell-and-tube-models. No extra room is needed to open a shell or to withdraw tubes. And since AQUA Blue handles pitch and roll, installation is possible in any direction.

All this simplifies design and reduces expense. The installation cost for AQUA Blue is far less than that of a shell-and-tube model, and roughly half that of a traditional plate-based solution.

Robust construction

Design and installation are made even easier by AQUA Blue's optimized configuration of connections and instrumentation. Once installed, it can be expected to last the life-time of the ship. AQUA Blue has a robust construction, with duplex piping and titanium wetted surfaces that will not corrode or erode.

Lasting performance

AQUA Blue's own reliability is matched by that of working with Alfa Laval. With 60 years of experience in freshwater generation, Alfa Laval is your guarantee of optimized performance, both today and tomorrow.

Alfa Laval is there to support you, from design and installation to operation anywhere in the world. Wherever your vessel sails, the Alfa Laval Service organization is close at hand with tools and expertise to extend equipment performance.

Alfa Laval can be found on board most ships and provides support through a global organization. Our products include systems for fuel conditioning, separation, heating, cooling, tank cleaning, filtration, desalination, waste treatment and ballast water treatment.

As a leading supplier, we strive for the most efficient, reliable and environmental solutions. Our drive is the partnership with our many customers – together we set the standard.

For more information, please visit us at www.alfalaval.com/marine

MDD00077EN 1403