



# AQUA Blue

Freshwater generator



The AQUA Blue freshwater generator.

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The AQUA Blue freshwater generator has an optimized process that uses just half the seawater of other freshwater generators. This minimizes pipework and allows the installation of smaller seawater pumps, which reduces both installation costs and energy consumption.

The process is based on unique 3-in-1 plate technology, which enables desalination in a single plate pack with one type of titanium plate. In AQUA Blue, this pioneering technology is combined with a wide range of enhancements for easier installation and simpler operation.

Since the plate pack contains the process vacuum, AQUA Blue has no outer shell and is smaller than other freshwater generators. Its construction is robust, with duplex piping and titanium plates that resist corrosion and erosion. Little maintenance is required, and the plate pack slides open for easy access to the interior without an additional service area.

## Application

AQUA Blue uses vacuum distillation to convert seawater into high-quality fresh water for domestic and process utilization. By providing a constant supply of low-salinity water and continuously controlling the water quality, it eliminates the need for bunker water.

AQUA Blue is designed for start-and-forget operation in periodically unmanned engine rooms and other automated operations. It is suitable for installation on ships and rigs, as well as in remote onshore locations.

Jacket water, hot water, steam injection or a Hot Water Loop can all be used as heating media.

## Features and benefits

- *Half the seawater flow.*

AQUA Blue requires only half the seawater needed by other freshwater generators, which means smaller seawater pumps can be used.

- *Lower energy consumption and emissions.*

The reduction in seawater pumping needs has a corresponding effect on the consumption of electrical energy. Less fuel has to be burned, which reduces both operating costs and CO<sub>2</sub> emissions. AQUA Blue also makes use of an energy-efficient IE3 motor.

- *3-in-1 plate technology.*

AQUA Blue incorporates the evaporation, separation and condensation processes into a single type of titanium plate. Desalination is handled within a single plate pack that also contains the process vacuum. No outer shell is necessary.

- *Simple, compact installation.*

With no outer shell and no additional service area, AQUA Blue has a minimal weight and footprint. Assembly can be handled on site and installation is simplified by the ability to use smaller seawater pumps and pipes. Since AQUA Blue is not sensitive to roll and pitch, it can also be installed in any direction.

- *Easy operation and maintenance.*

AQUA Blue is operator-friendly and offers start-and-forget operation, which saves time for the crew. Optimized flow distribution across the plates prevents dry spots and keeps scaling to a minimum. Maintenance intervals are long and the plate pack slides open for easy access to the interior.

- *Proven technology.*

AQUA Blue has been thoroughly tested in full scale, both in Alfa Laval's thermal laboratory and aboard vessels at sea.

- *Low-salinity water.*

Regulation of the seawater flow optimizes the performance of AQUA Blue, ensuring high-quality fresh water with a maximum salinity of 2 ppm. The fresh water has a lower content of dissolved solids than water supplied by other freshwater generators and can be used directly by the steam boilers.

- *Continuous quality control.*

AQUA Blue's salinometer-equipped control system continuously monitors the quality of the outgoing fresh water.

## Basic equipment

The AQUA Blue freshwater generator consists of a single plate pack containing a flexible number of titanium plates.

These plates are suspended within a frame, which comprises a carrying bar, frame plate and pressure plate. Evaporation, separation and condensation all occur within the same plate pack.

Among the plate pack features are gaskets with rubber flaps that indicate correct plate assembly.

Connected to the plate pack is a combined system for condenser cooling water, feed water and ejector water.

The seawater flow is regulated to ensure optimized production and fresh water with the correct quality. The freshwater system consists of a freshwater pump and a freshwater control sensor that ensures a stable outgoing flow of high-quality fresh water.

Connecting flanges can be delivered according to DIN, JIS or ANSI standards.

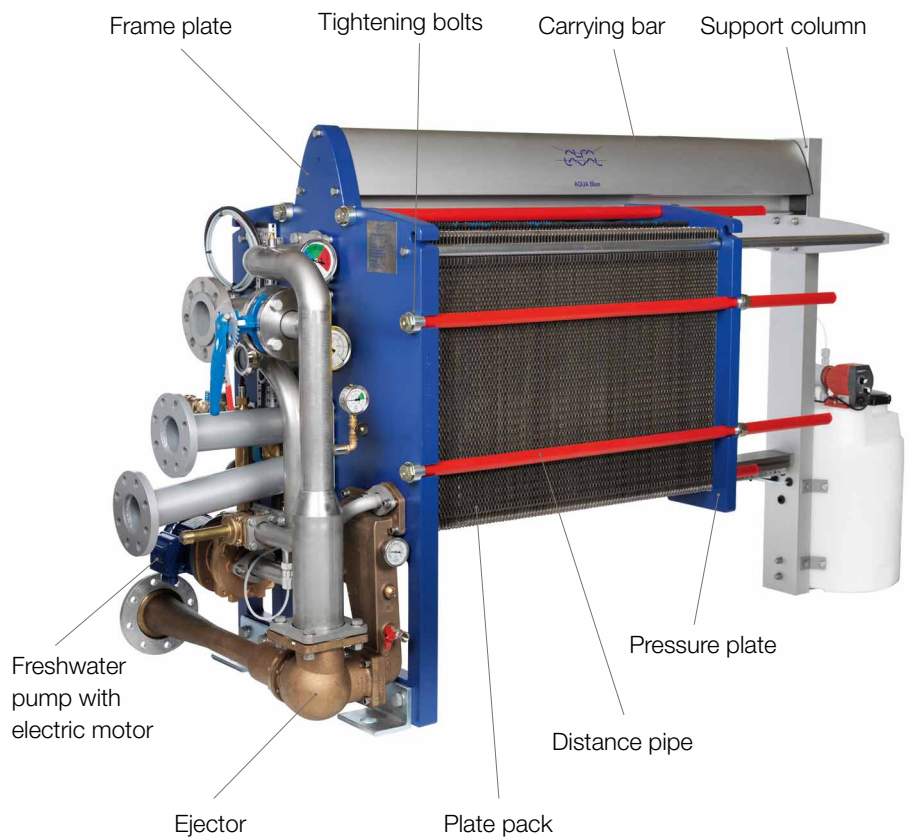
## Additional equipment

- Combined cooling and ejector water pump with electric motor
- Control panel with motor starters and salinometer
- Anti-scale chemical dosing unit for feed water treatment

## Optional equipment

- Steam heating system with direct steam injection
- Equipment for steam boosting with a Hot Water Loop system
- Build-on control panel
- Build-on anti-scale chemical dosing unit
- Distance indicators that ensure proper plate alignment and correct tightening
- Cleaning-in-Place (CIP) unit
- Freshwater pH adjustment equipment
- Freshwater disinfection equipment

The AQUA Blue freshwater generator.



The AQUA Blue pictured is equipped with some options.

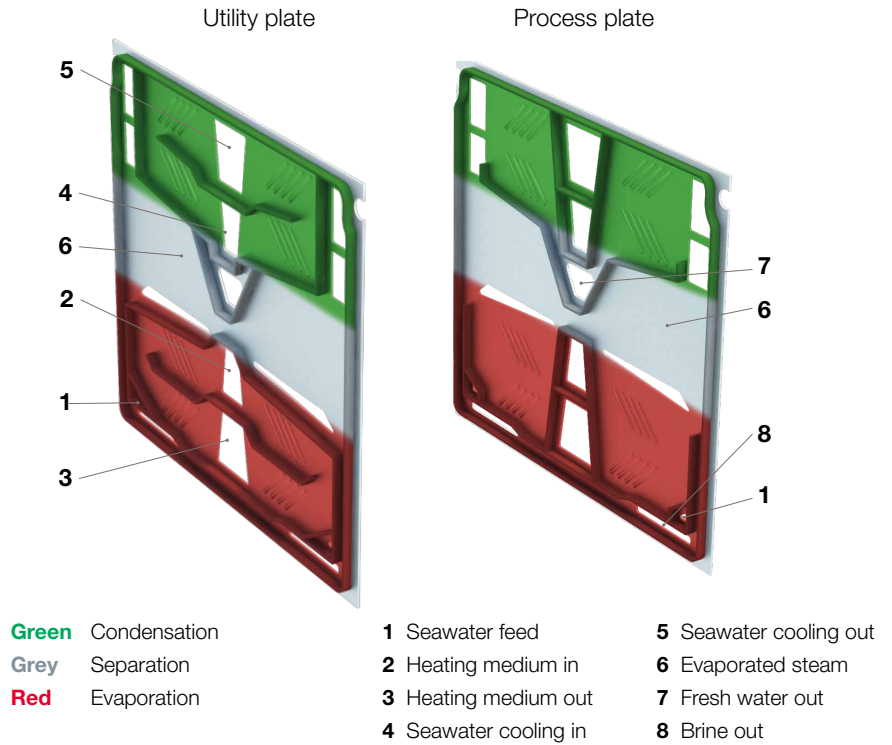
### Operating principle

AQUA Blue's flow of feed water is taken from the flow of seawater coolant. Feed water enters the lower (evaporator) section of the plate pack, in which the plates are warmed by the heating medium. Here the water is evaporated at around 40-60°C in a vacuum of 85-95%, which is maintained by the brine/air ejector.

The vapour produced rises between the plates into the middle (separator) section of the plate pack, where any droplets of entrained seawater are removed. Gravity causes these droplets to fall back into the brine sump at the bottom of the freshwater generator.

Only clean freshwater vapour reaches the top (condenser) section of the plate pack, which is cooled by a flow of seawater. Here the vapour is condensed into fresh water, which is pumped out of the freshwater generator by the fresh-water pump.

Evaporation, separation and cooling in the AQUA freshwater generator.



### Installation

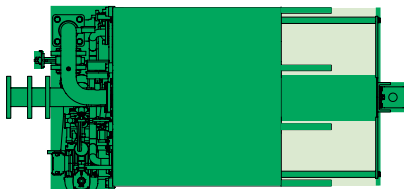
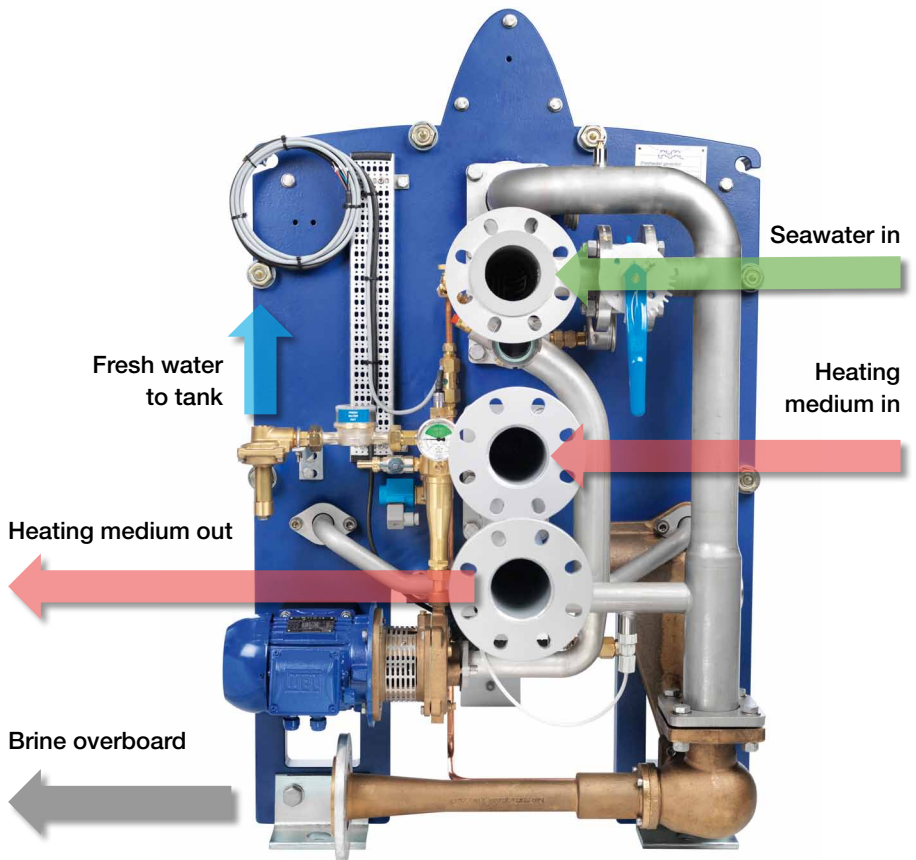
AQUA Blue is easily installed on ships and rigs, as well as in remote onshore locations. Since there is no need for an extra service area, the installation is highly compact.

The heating medium is either hot water, such as jacket water from the engine, or a closed circuit heated by steam.

An ejector pump supplies seawater coolant for the condenser, feed water for evaporation and drive water for the combined brine/air ejector. This pump is separately installed and connected to its own seawater intake.

The fresh water produced is pumped into the storage tank by a built-in freshwater pump.

A control panel, which incorporates motor starters and a salinometer, supplies electrical power to the ejector pump and freshwater pump, as well as control voltage to the salinometer and dump valve.



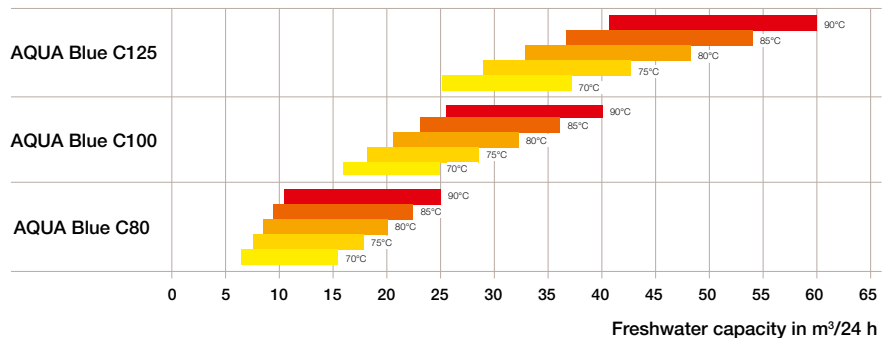
Not only does AQUA Blue have a smaller footprint (dark green) than other freshwater generators, it also has a service area (light green) up to 50% smaller than that of shell-and-tube models. Because the vacuum is contained in the plate pack, there is no outer shell that requires extra space to open.

## Operations

- AQUA Blue is designed for intuitive operation and easy maintenance. If Alfa Laval recommendations are followed, only a few service inspections are needed.
- Connections for Cleaning-in-Place (CIP) are available.
- Standard spare part kits are available.
- The installation manual provides detailed information regarding correct installation in electronic or printed format:
  - System description
  - Installation instructions
  - Technical data and drawings
- The operation manual provides detailed information regarding operation and maintenance in electronic or printed format:
  - System description
  - Operating instructions
  - Chemical dosing of anti-scaling chemicals
  - Troubleshooting
  - Maintenance of major components
  - Spare parts drawings
  - Technical data and drawings
- Commissioning and technical services are available from all Alfa Laval offices, including installation assistance and advice on operation and maintenance.
- Training in all aspects of freshwater generation can be provided by Alfa Laval.
- Spares and maintenance can be provided by Alfa Laval Service Centres. Details are available from local Alfa Laval offices.

## Capacity range

The AQUA Blue series covers a capacity range from 10 to 60 m<sup>3</sup>/24 h, depending on the heating medium and cooling water temperatures. An AQUA Blue freshwater generator can be dimensioned to suit any jacket water temperature from 55 to 95°C at cooling water temperatures from -2 to 36°C.



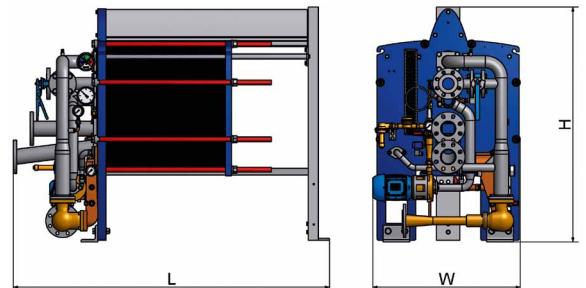
Capacities at different heating medium temperatures and nominal flow for a minimum and maximum number of plates at a seawater temperature of 32°C.

## AQUA Blue dimensions

Size	L		W		H		Weight	
	mm	in	mm	in	mm	in	kg	lbs
AQUA Blue C80	1492–1692	58.7–66.6	882	34.7	1395	54.92	787–833	1735–1836
AQUA Blue C100	1692–1892	66.6–74.5	882–917	34.7–36.1	1395	54.92	869–930	1916–2050
AQUA Blue C125	1892–2292	74.5–90.2	917	36.1	1395	54.92	942–1049	2077–2313

## Technical data

<b>Main supply voltage</b>	3-phase, 220 V up to 690 V
<b>Control voltage</b>	1-phase, 100/110/115/230 V
<b>Frequency</b>	50 or 60 Hz



## Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineering solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

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