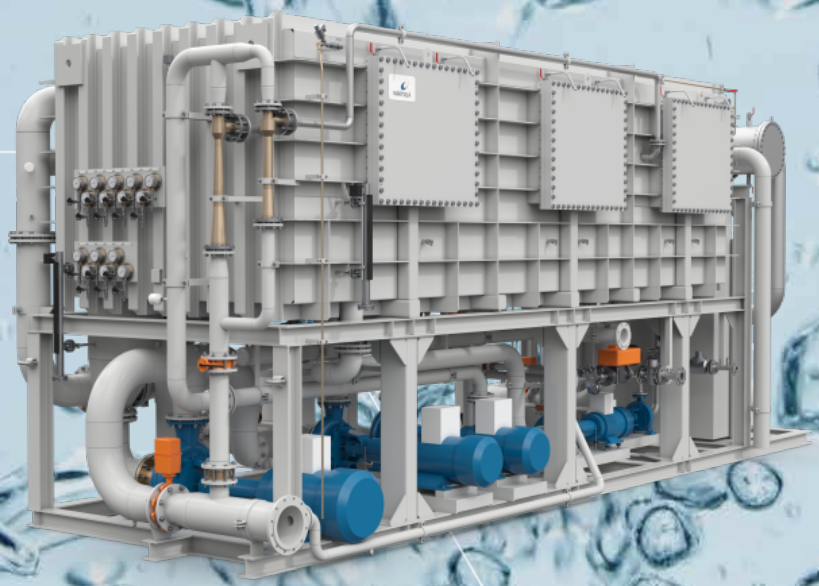
WATER& WASTE
A WÄRTSILÄ® BUSINESS

FRESHWATER GENERATORS

MULTI STAGE FLASH EVAPORATORS



Introducing Wärtsilä's freshwater generators

Within the marine world Wärtsilä's Freshwater Generators (FWG) are known as standard for on-board freshwater production. Ship owners, builders and operators can source from the widest range of freshwater making technologies available to the market today. This range includes Reverse Osmosis Plants, Horisontal Inner Tube Evaporators, Multi Flash Evaporators, Single Stage Desalination Plants or a combination of these. Also a growing number of land-based applications is fitted with our equipment. In choosing Wärtsilä as your freshwater production partner you secure a flexible, reliable, and fully automated solution.

Specialist solutions requiring high customer focus

Our diverse and dedicated team of engineers is developing, manufacturing and distributing freshwater solutions for and to customers worldwide. Thanks to a creative out-of-the-box mindset, this team excels in innovative and specialist solutions, bespoke set-ups that require a high customer focus.

Every successful implementation of a freshwater generator starts with an accurate analysis of the vessel's status, identifying possibilities and needs. In each case our team will strive for a solution that is most energy and space efficient. A higher energy efficiency, for instance, can often be reached by looping to energy sources already available on a vessel. Greater flexibility in construction and sizing can be accomplished by making a combination of different FWG technologies. This approach especially comes in handy when retrofitting engine rooms.

Building on more than 125 years of history

Our freshwater division in Geesthacht, Germany, is also known as Wärtsilä Serck Como GmbH and part of the bigger Wärtsilä Water & Waste business unit.

The company's expertise in freshwater generation is unrivalled: in 1894 Serck Como started producing its first evaporator for sea-going vessels. Having survived two world wars, we know what it means to adapt to ever changing circumstances. We believe that it is important to both invest in own innovations and to adapt to new external trends. As water maker specialist our focus is on the future. We are confident to come up with solutions for any technical challenge that will come our way.

Total water & waste solution

Freshwater generators are part of a much wider water & waste product range, offered by Wärtsilä's eponymous "Water & Waste" business unit. Ship owners, builders and operators that are looking for a single provider for all their water, waste and wastewater challenges, will find the peace of mind they are looking for.

In addition to freshwater solutions, our total solution offer includes ballast water treatment technologies, wastewater, wet and dry waste treatment systems. Thanks to Wärtsilä Water & Waste's global agent and distributor network our after-sales and spare parts services are reliable and well organised. We are able to help our customers from the design phase of their freshwater equipment to the delivery of spare parts.

Product range

Reverse Osmosis Plants

Horisontal inner Tube Evaporators

Multi Stage Flash Evaporators

Single Stage Desalination Plants

MSF

Wärtsilä's multi-stage flash principle is one of the most reliable thermal seawater desalination process in the world. On top of that it is the only evaporation principle where heat transfer and evaporation are strictly separated. This minimises the risk of scaling and reduces maintenance costs.

Wärtsilä's Multi-Stage Flash Evaporator (MSF) is used for producing freshwater from seawater, well water or industrial water. A special advantage of the multi-stage flash technology is that the specific heat consumption – or thermal efficiency – can be continuously adapted to the individual requirements of each application. The produced distillate has a very low salt content which makes it suitable as technical water (e.g. boiler feed water). The distillate quality and quantity are independent from the seawater temperature which makes the MSF technology a reliable source for freshwater.

Working principle

After leaving the first stage condenser (3), the seawater flows through the brine heater (1), where the heat input to the plant (steam or engine jacket water) causes a further temperature increase.

The seawater leaves the brine heater (1) and enters the first flash chamber (2), reaching a brine top temperature of approx. 80°C. At this point the pressure of the incoming seawater is suddenly reduced, by means of an orifice, below its equilibrium vapour pressure resulting in explosive boiling or evaporation (flashing). The pure vapour produced is then condensed, giving up its latent heat to preheat the incoming seawater (3). If this process is repeated over a large number of effects, at successively lower pressures and temperatures, large distillate production rates at reasonable performance ratios can be achieved.

Technical data

Model	Capacity, ton/day	L x W x H, mm	Power, kW	Dry weight, kg	Wet weight, kg
115-5	115	5 700 × 2 900 × 3 000	915	18,000	21,000
300-6	300	7 300 × 2 900 × 3 300	2,388	27,000	32,000
650-6	650	9 200 × 3 500 × 3 900	5,146	37,000	45,000
775-8	775	10 500 × 3 600 × 3 900	4,812	42,000	52,000
850-8	850	11 700 × 4 200 × 3 900	4,780	43,000	53,000
950-8	950	12 000 × 3 700 × 3 900	6,395	45,000	55,000

Capacity up to 1500 t/d.
Steady production of freshwater at seawater temperatures 0 – 32°C.

Key benefits

- Either steam, engine jacket water or combination can be used for heating.
- Full-automatic or semi-automatic operation.
- Can be operated in part load.
- Heat transfer and evaporation are taking place in different areas, resulting in a minimised risk of scaling.
- Sturdy construction with low maintenance demands resulting in high availability.
- Solution with lowest sensitivity to malfunction & lowest lifecycle costs.
- Components in contact with seawater or distillate are manufactured with corrosion resistant materials, e.g. copper-nickel.
- Flexible dimensions allow for best utilisation of space.
- Operating frequency converter for pumps saves energy.
- Water conductivity < 4 µS/cm

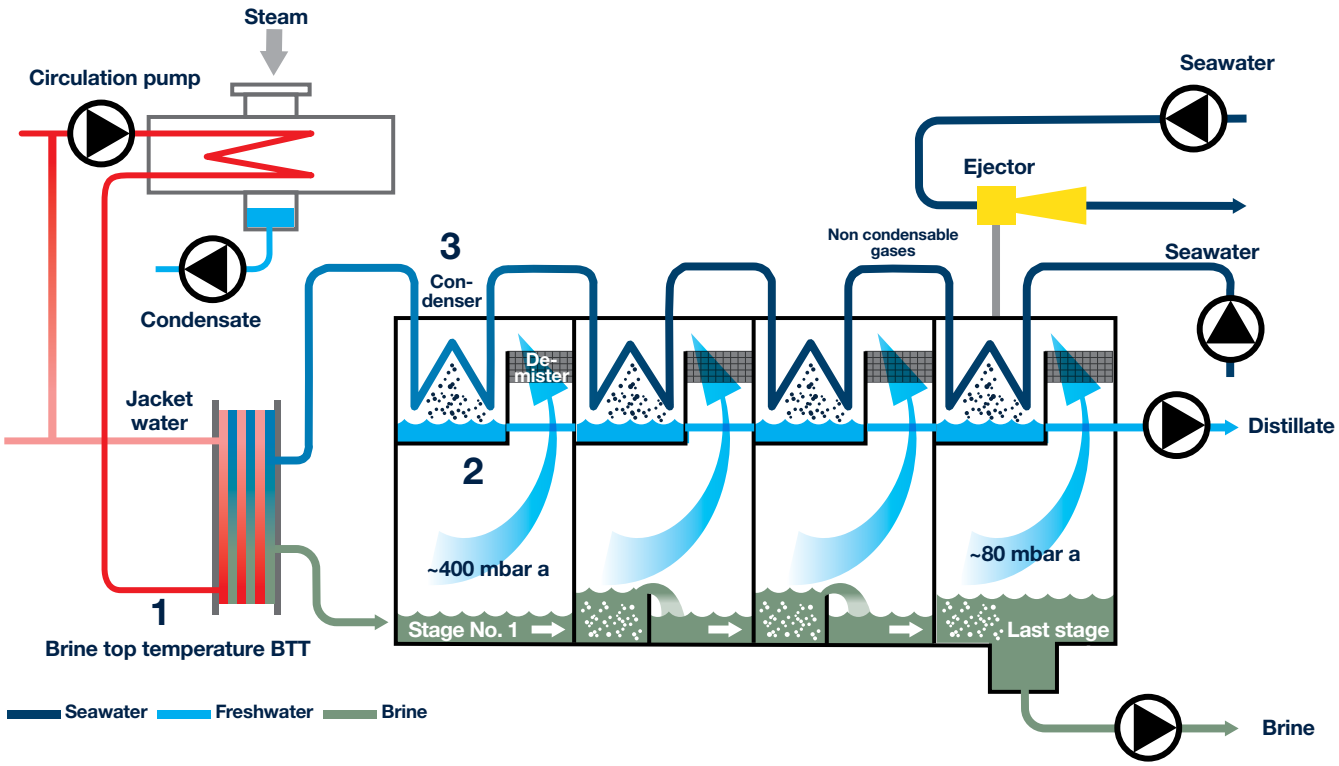
Scope of supply

Delivered as standard

- Flash vessel with condenser and condenser tubes
- Base frame
- Pumps, including e-motors
- Air ejectors
- Feed water heater
- Distillate cooler
- Complete internal pipework
- Control equipment and instrumentation
- Optional steam booster

Options

- Steam booster
- Distillate cooler
- Frequency converters for pumps
- Cleaning stations


Steam
Circulation pump
Condensate
Jacket water
1
Brine top temperature BTT
3
Con-denser
De-mister
2
~400 mbar a
Stage No. 1
Seawater
Ejector
Non condensable gases
Seawater
Distillate
~80 mbar a
Last stage
Brine
Seawater
Freshwater
Brine

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Selection criteria

	RO	HiTE	MSF	SSD
Production capacity: 5 - 35 ton/day				●
Production capacity: 35 - 175 ton/day	●	●	●	
Production capacity: 175 - 1500 ton/day	●		●	
High quality distillate < 4 µS/cm		●	●	●
Bespoke design possible	●	●	●	
Able to use ship's rest heat (from engine)		●	●	●
Suitable for land-based applications	●	●	●	
Plug & Play solution, small footprint				●
Fully automatic operation (integrated PLC)	●	●	●	
Need for high filtration	●			●
Able to handle water with oil particles / emulsion		●	●	●
Maintenance less than once times per half year (in full time use)		●	●	●
Low Capex	●			●
Electrical consumption kW/ton distillate[1]	3.5	3.2	3.0	8.5
Modular design for extra flexibility	●			

[1] values can vary

Service

Wärtsilä Water and Waste has in-house technical service teams that are able to assist customers throughout the lifecycle of their freshwater generation installations. These teams help with the optimisation of efficiency and performance. Customers can also call in our technical support during installation, start-up, operation and maintenance.

Our facility in Geesthacht Germany provides customized solutions with short delivery time and with a tight quality control. Our worldwide network of agents and distributors ensures direct local support for the majority of our customers.

Scope of equipment	Scope of performance
We service following equipment: • Reverse osmosis plants • Desalination units • Evaporation systems • Water treatment systems • Cooling • Pre-heating • Condensation	• Project consultancy • Assembly • Commissioning • Training • Maintenance • Inspection / Preventive maintenance • Spare part management • Automation & updates

All our services can be certified according to following classification societies:
TÜV, DEKRA, BV, LROS (Class 2.2), DNV-GL (Class II), RINA, RMROS, CCS, KR and ABS.

12.2021 /Bock's Office

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