



Multi Stage Flash (MSF) Evaporators

for marine application



Hamworthy Serck Como GmbH design and manufacture multi-stage flash (MSF) evaporation plants which are employed for producing fresh water from sea water, well water or industrial water. These plants are used for ships and on land based installations for producing process and potable water and are also used for reduction of the volume of industrial waste water.

Description of plant and process

The sea water (feed) flows under positive pressure through the tubes of a number of condensers from the last stage to the first stage whereby it is heated gradually by the vapour condensing in the various stages. After leaving the first stage condenser, the sea water flows through the brine heater where the heat input to the plant (steam or engine jacket water) causes a further temperature increase. The sea water leaves the brine heater at the Brine Top Temperature (BTT = approx. 80°C). Up to this point, the pressure of the sea water is above atmospheric pressure and therefore below boiling pressure. The sea water is then directed into the first stage of the plant which is at a pressure below boiling pressure. In order to return to a state of equilibrium, part of the sea water flashes off such that the saturation temperature corresponds to the pressure in the stage. This process is repeated from stage to stage whereby the pressure and the temperature in each stage is less than that of the preceding stage. The brine is then discharged from the last stage by the brine pump. The distillate is drawn through from the first to the last stage condenser where it is discharged by the distillate pump. The non-condensable gases released in the various stages are discharged by the ejectors.

Advantages:

- ▶ Heat transfer and evaporation take place in different areas, resulting in a minimised risk of scaling.
- ▶ Sturdy construction with low maintenance demands resulting in high availability.
- ▶ Compact construction with either a cylindrical or rectangular cross sectional design for high performance with low space requirements and weight.
- ▶ Components in contact with sea water or distillate are manufactured of corrosion resistant materials (e.g. copper-nickel).
- ▶ Each evaporator is subjected to a pressure test before leaving our works.
- ▶ Qualified after-sales service and support is guaranteed.

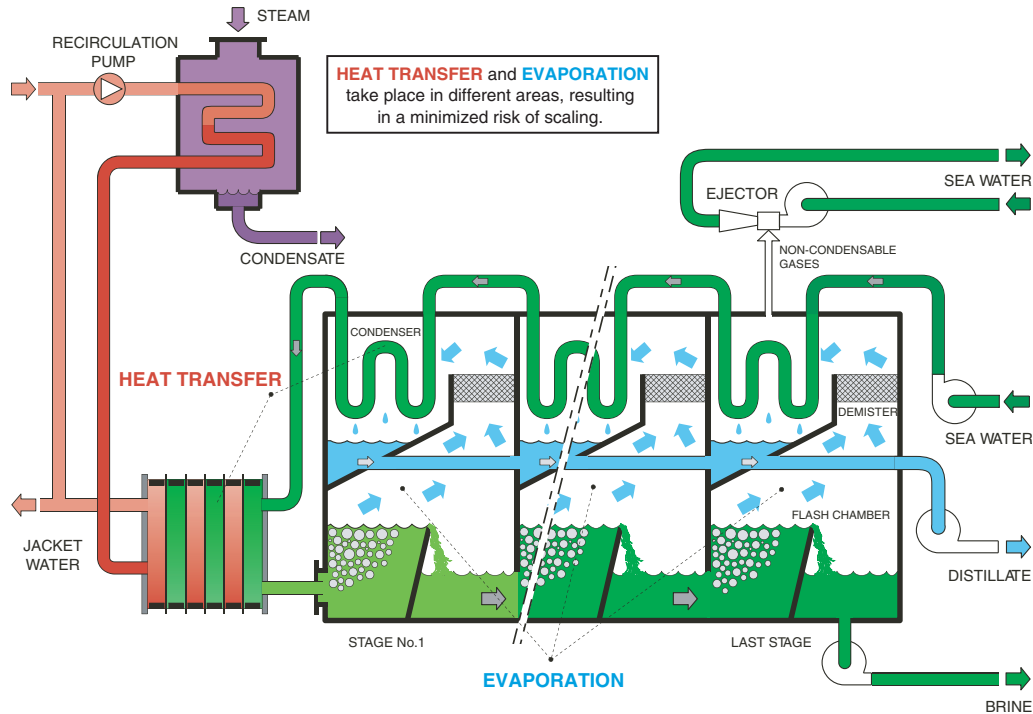
Characteristics:

- ▶ The capacity of our standard and tailor-made evaporators ranges from 50 t/d to 1000 t/d.
- ▶ Steady production at sea water temperatures between 2 to 32°C.
- ▶ Either steam, engine jacket water or a combination of these can be utilised for heating.
- ▶ The residual salt content of the distillate is:
≤ 10µS/cm (4 ppm NaCl).
- ▶ On request, a potable water treatment unit according to WHO - Standards can be supplied.
- ▶ Fully automatic operation (start up, shutdown and partial load).
- ▶ The optimisation of the evaporator design (number of stages, condenser cooling surfaces and plant components) is fully computerised.
- ▶ Our range of MSF evaporators are approved by all well known classification companies.



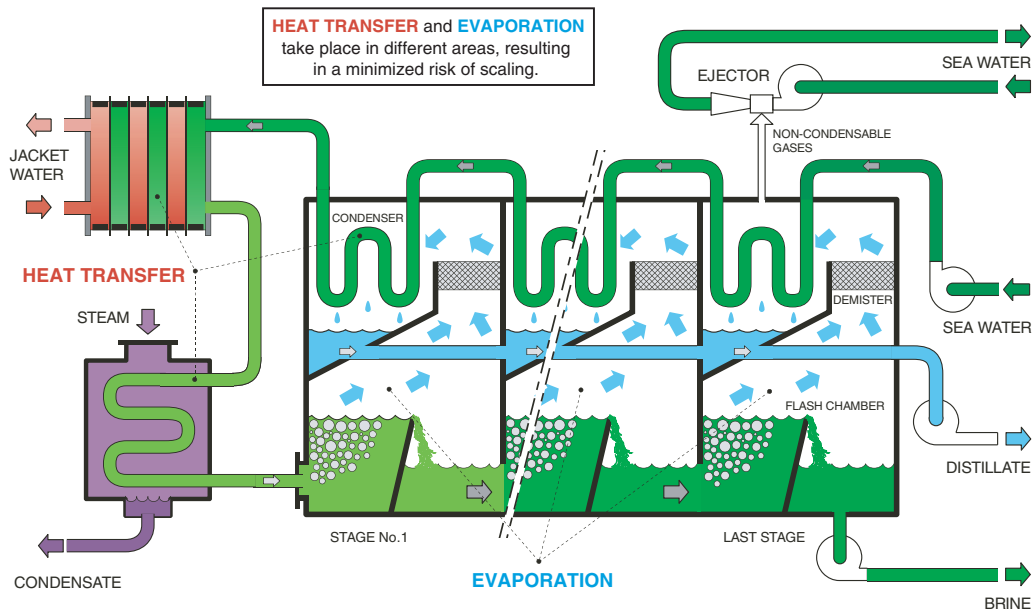
Flow diagram of a MSF evaporator

Steam and/or jacket water heated with jacket water booster



Flow diagram of a MSF evaporator

Jacket water and/or steam heated with sea water booster



Approval Certificate No. 202595



Hamworthy Serck Como GmbH
 Pankower Str. 16 - 18
 D-21502 Geesthacht, Germany
 tel: ++49 4152-805-0 fax: ++49 4152-805-105
 e-mail: geesthacht@hamworthy.com
 website: www.hamworthy.com

a subsidiary of Hamworthy plc



The manufacturers reserve the right to alter the specification and data to incorporate improvements in design. Certified drawings will be issued on request.

© All details copyright Hamworthy plc.