# Multiple Effect Evaporators (MED)

## for marine application

**Features of our evaporating system**

Hamworthy Serck Como multiple effect evaporators (MED) are individually designed (computer-aided) to the customers specific requirements. As far as possible, standardised sizes for the evaporator and condenser vessels are used. The upper end of the rising film evaporation tubes are protruding the upper tube plate of the heating system in order to avoid that brine 'after evaporation' can flow back into the tubes. Thus the vapour produced inside the tubes can leave the tubes without having to pass the brine level on the upper tube plate. By this way excessive entrainment of liquid, resulting in a higher vapour and distillate salinity, is avoided.

The residual distillate salinity is continuously measured. If the salinity exceeds the adjustable limit, the distillate is automatically dumped into the sea.

For easy access to the wire mesh mist eliminators (demisters), the evaporators are equipped with removable covers.

On the condensation side the heating elements are equipped with special internal air cooling zones which serve for optimum concentration of the non-condensable gases to be evacuated by the ejector.

**Scope of supply**

- **Casing with cover**
- **Evaporator tubes (CuZn20Al)**
- **Condenser tubes (CuZn20Al)**
- **Demister**
- **Combined brine/air ejector**
- **Distillate pump with electric motor**
- **Control panel with motor starter, built in salinometer and common alarm**
- **Documentation including operating instruction manual in German or English language**

**Accessories**

- **Set of pressure gauges**
- **Set of thermometers**
- **Relief valve**
- **Salinity measuring cell**
- **Distillate sample cock**
- **Distillate pressure set valve**
- **Feed water valve and orifice**
- **2-way solenoid valve**
- **Vacuum meter**
- **Sight glass**
- **Distillate meter**
- **Internal wiring and piping**
- **Chemical tank with dosing equipment**

**Optional supply**

- **Sea water pump with electric motor**
- **Steam heating system**
- **Rehardening filter**
- **Disinfection unit**
- **Remote indication salinity**
- **Remote indication distillate quantity**
- **Cleaning system**

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**Description of working principle**

The first stage evaporator is heated by jacket water from the diesel engine or other sources, utilizing waste heat.

The heating medium flows over the tubes and sea water is passed through the tubes.

Evaporation takes place inside the tubes under vacuum.

Due to the Hamworthy Serck Como extended heating tube design, the vapour produced is not passed through the brine in the upper casing. Drops of brine which are still contained in the vapour are separated by the mesh type demister fitted in the upper part of the evaporating chamber.

The vapour from the first stage is then passed to the second stage evaporator where it condenses on the outside of the evaporator tubes, transferring its latent heat to the sea water inside the tubes. The vapour produced in the second stage is led in the same manner to the third stage. After passing through the demister, the vapour produced in the third stage is led into the condenser. The condenser cooling water flows through the tubes and the vapour is condensed on the outside of the tubes.

Part of the preheated sea cooling water is used as feed water. For better thermal efficiency, the hot brine of stage 1 is transferred to the feed water inlet of stage 2. The brine of stage 2 is then passed to stage 3.

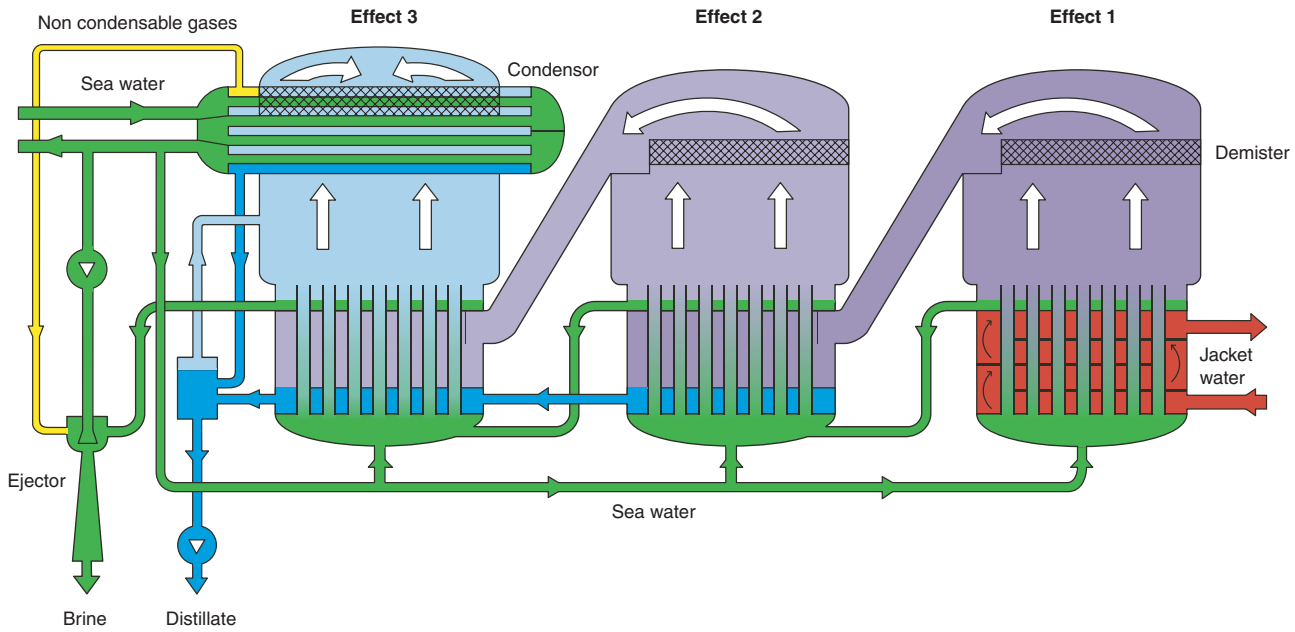
The cumulated brine of all stages, the air and other non-condensable gases are discharged overboard by a sea water operated combined brine/air ejector.

The cumulated distillate of all stages is discharged by a centrifugal single stage distillate pump.

Depending on the ship's sea water cooling system, the motive sea water flow from the ejector is delivered either by a separate sea water booster pump with suction from the condenser outlet or sea water outlet flow is used directly if pressure is sufficient.

The evaporator can be designed for manual or fully automatic operation.

## Flow Diagram: Multiple Effect Desalination (MED)




Approval Certificate No. 202595

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