

# Freshwater Distiller



**SONDEX**



SONDEX A/S is a Danish company specialized in development, production and global marketing of plate heat exchangers and freshwater distillers.

Since the very start in 1984 SONDEX has grown to be one of the leading companies on the world market and has, by means of technological innovation developed and designed a new generation of Freshwater Distillers.

The SONDEX Freshwater Distiller is based on the plate heat exchanger technology in single- or multistage which makes the SONDEX Freshwater Distiller very efficient and compact toward traditional freshwater distillers on the market.

In the course of time the SONDEX Freshwater Distiller has appeared to be a first class and a reliable product operating for a long time without maintenance.

After sales service is very important for all parties in today's busy world. A break down of the equipment can be fatal for the ship operation as well as the ship owner. To minimize the period of breakdown SONDEX has built up a worldwide after sales net consisting of our own subsidiary companies and agents, all well educated to support the customers.

The need for pure and clean water in the world of today is increasing very fast due to the growing world population, pollution and environmental problems that the world is facing. In the coming years and decades clean drinking water will be a limited resource. SONDEX Freshwater Distiller is one of the solutions to meet the demands for fresh water in the future both on the marine, offshore and land-based markets.

With technical innovation and a worldwide service net it is our aim to keep and extend the today's market position.



# SONDEX Single-Stage Freshwater Distiller

## FEATURES AND APPLICATION



- The SONDEX single-stage freshwater distiller utilizes the heat from diesel engine jacket cooling water to produce pure drinkable water from seawater.
- The SONDEX single-stage freshwater distiller is easy to operate and based on highly resistant materials which are easy to maintain.
- The capacity range is from 1-100 tons/day.
- The SONDEX single-stage freshwater distillers are today installed on hundreds of vessels providing drinkable and technical water with very low salinity.
- The SONDEX single-stage freshwater distiller is equipped with a salinity controller with alarm, running-hour meter and chemical dosing unit as standard.
- The SONDEX single-stage unit operates fully automatically according to given water flow and pressures, and requires a minimum of supervision.
- The SONDEX single-stage freshwater distiller is based on the specially designed "vertical tube" design plates resulting in excellent water distribution with no disturbing contact points in the boiling stage. Thus the water scaling is very low.
- Steam can also be used as the heat source instead of the hot jacket water.

## OPERATION

The SONDEX single-stage freshwater distiller consists of two SONDEX titanium plate packs acting as an evaporator and a condenser respectively.

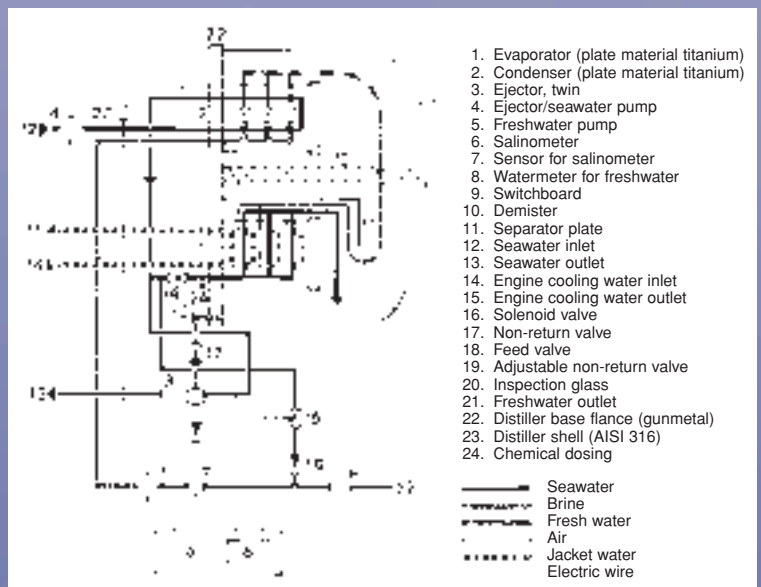
The evaporation chamber is kept under vacuum by a water ejector driven by the seawater outlet from the condenser. A part of this heated seawater is used as feed water for the evaporator.

The feed water evaporates when entering the evaporating chamber due to the vacuum condition. Water spray and droplets are partly removed from the vapour by the separator plate mounted on top of the evaporator and partly by a build-in demister.

The water droplets separated fall back into the brine which is extracted from the sump by means of the ejector pump. The desalted vapour passing through the demister will be sucked into the plate heat exchanger where it will be condensed by means of cold incoming seawater.

The pure distilled water will be taken out by means of an integral freshwater pump. The pure water taken out from the condenser will be controlled by a salinometer to supervise that the pre-set salinity (1-10 p.p.m.) will be reached.

If the salinity exceeds the level specified, the solenoid valve in the discharge line of the distiller pump is automatically activated and the faulty distillate is returned to the feed line.



# SONDEX Two-Stage Freshwater Distiller

## FEATURES AND APPLICATION



- The SONDEX two-stage freshwater distiller is based on the utilization of waste heat and basically used where high production is required, and the energy available is limited.
- The SONDEX two-stage unit is therefore only consuming about half of the energy of the single stage units.
- The typical applications are off-shore rigs, passenger ships, hotels and other places where the waste heat is limited or expensive to create.
- The SONDEX two-stage units have been specially designed and fully scale tested, before introduction to the market, in order to secure a stable and reliable production with long service intervals, and production of very pure freshwater with a low salinity.
- The SONDEX two-stage units are today covering a capacity range from 50 tons/day up to 150 tons/day. Therefore we can offer our customers an economical and technical solution which is far superior to any other evaporators on the market.
- The SONDEX two stage unit is remarkable on many points and is also based on the specially designed "vertical tube" design plates resulting in excellent water distribution with no disturbing contact points in the boiling stage. Thus the water scaling is very low.
- The SONDEX two-stage unit operates fully automatically according to given water flow and pressures, and requires a minimum of supervision.
- Steam can also be used as the heat source instead of the hot jacket water.

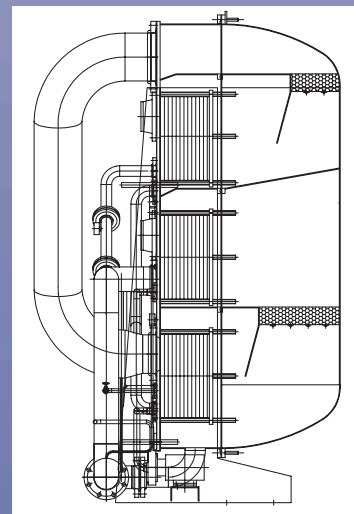
## OPERATION

The SONDEX two stage unit consists of three SONDEX titanium plate packs located in two separated chambers working with different vacuums.

The upper plate pack – called stage one – evaporates the feed water at 70% vacuum in chamber one. The steam is going through a big diameter pipe down to the second stage where it condenses and releases its energy into the secondary side of the plate pack filled with pre-heated brine obtained from stage one. The pre-heated brine is evaporating immediately, as the second stage is working at 90% vacuum in chamber two. The final condenser plate pack, also located in chamber two, is cooled with cold seawater driving the specially designed SONDEX twin-ejector which removes the non-condensable gasses and brine from the flooded evaporation process in both stages.

Each chamber is equipped with a demister removing water drops and salt from the steam produced in stage one as well as stage two. This results in a high quality of freshwater coming out from both condensers.

The freshwater produced in both stages is flowing into a "flash tank" securing any steam bobbles to be removed before entering the freshwater pump, which pumps the water into the storage tanks.



# The SONDEX Freshwater Distiller Plates

SONDEX Freshwater Distillers are constructed with plate heat exchangers as evaporator and condenser.

SONDEX Freshwater Distiller plates are designed to obtain the best working conditions.



SONDEX is the only company having developed special plates for the freshwater distiller.

The Sondex design is based on plates which create vertical tubes on the side where evaporation and condensing takes place, and on the service side the plate is designed with a complete free flow pattern.

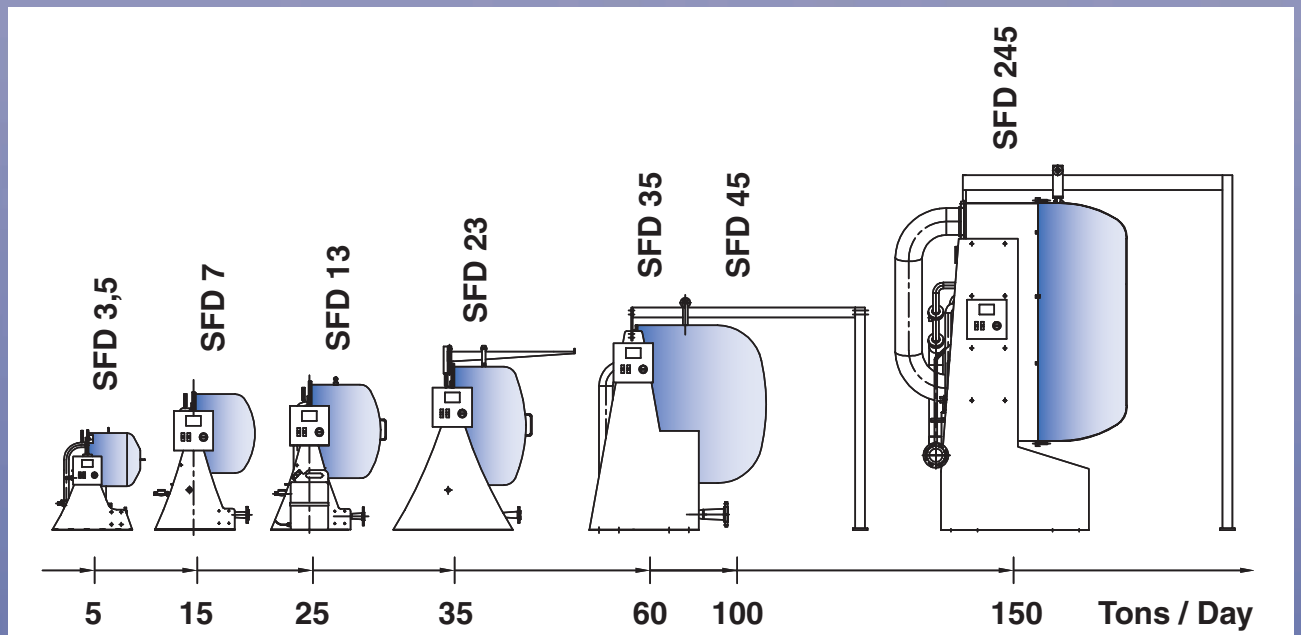
The free flow pattern makes it possible to use any type of water for the service side.

The vertical tube design on the evaporation and condensing side has proven to give excellent distribution of the water with no disturbing contact points in the boiling stage.

This results in less fouling on the plates and longer intervals between cleaning.

# The SONDEX Range of Freshwater Distillers

The range of SONDEX Freshwater Distillers is from 1 – 150 tons of water per day. This means that we are able to cover the biggest part of the inquiries on the market today.



# Additional Equipment

## SONDEX RE-HARDENING FILTERS

- Sondex re-hardening filters are used to obtain drinkable water with a pH value of 7 - 8.5 and mineralize the water condition to suit the human body.
- Sondex re-hardening filters are equipped with necessary valves, pressure gauges and strainers, ready for installation.
- Sondex re-hardening filters remove solid particles and contaminants through a specially designed bottom filter.
- Sondex re-hardening filters are made with by-pass function in case of service and technical water production.
- Sondex re-hardening filters are manufactured in stainless steel to ensure a long lifetime.
- Sondex re-hardening filters are delivered with pH adjusted filter-material.
- Sondex re-hardening filters cover a range from 0,1 to 2,75 m<sup>3</sup>/h.



## SEAWATER PUMP

- Sondex usually supplies the seawater pump for driving the ejector and cooling the condenser.
- Sondex-supplied seawater pumps are designed to the actual duty of the freshwater distiller in accordance with DIN24255 and ISO2858.
- Sondex-supplied seawater pumps are high quality base mounted In-line pumps for 10 bar maximum pressure.
- Sondex-supplied seawater pumps are equipped with standard IEC motors
- Sondex-supplied seawater pumps have NiAl-bronze impeller, cast bronze housing and stainless steel shafts.
- Sondex-supplied pumps have a full sparepart programme with fast delivery all over the world.

## SONDEX STEAM ARRANGEMENT

- Sondex steam arrangement can be used in cases where the waste heat is not sufficient or available.
- Sondex steam arrangement is designed as a self-acting unit ensuring stable production capacity by injecting steam to the self-circulating water circuit.
- Sondex steam arrangement is equipped with condensate release valve to keep a constant low operation pressure as well as a safety blow valve.
- Sondex steam arrangement is equipped with on/off valve for separation of jacket water system as well as filling valves for steam system.
- Sondex steam arrangement is based on high alloy materials and quality control valves for self-acting or pneumatic operation.



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