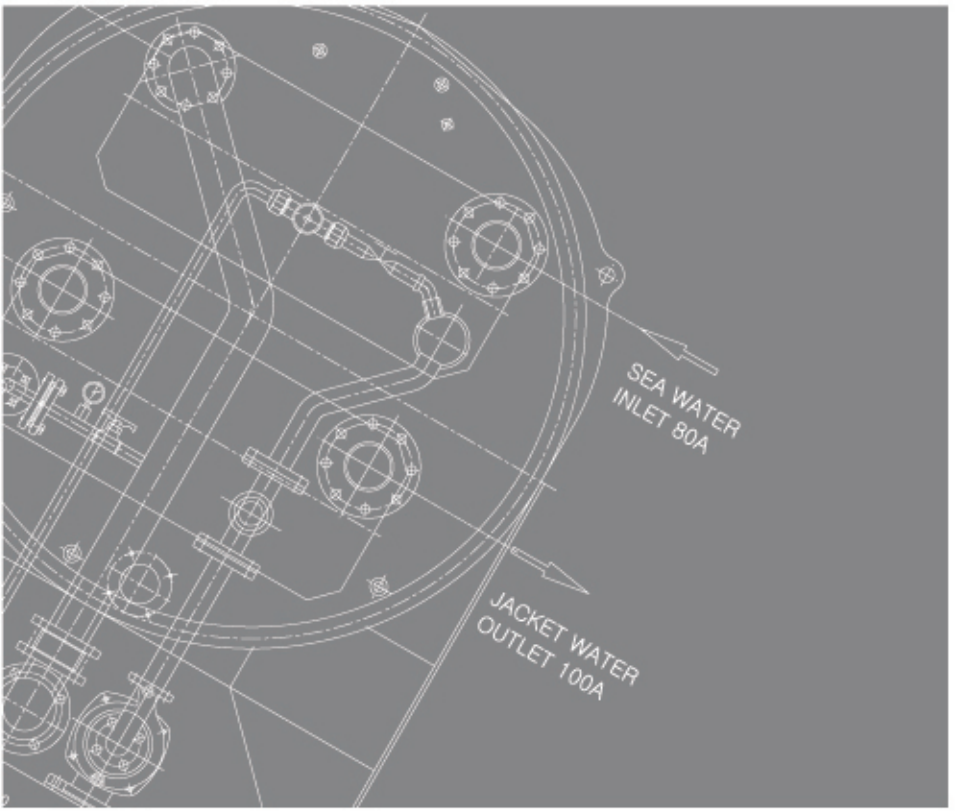
Fresh Water Generator

Vacuum Evaporating Distiller



DHP Engineering Co., Ltd.

DHP Vacuum Evaporating Distiller

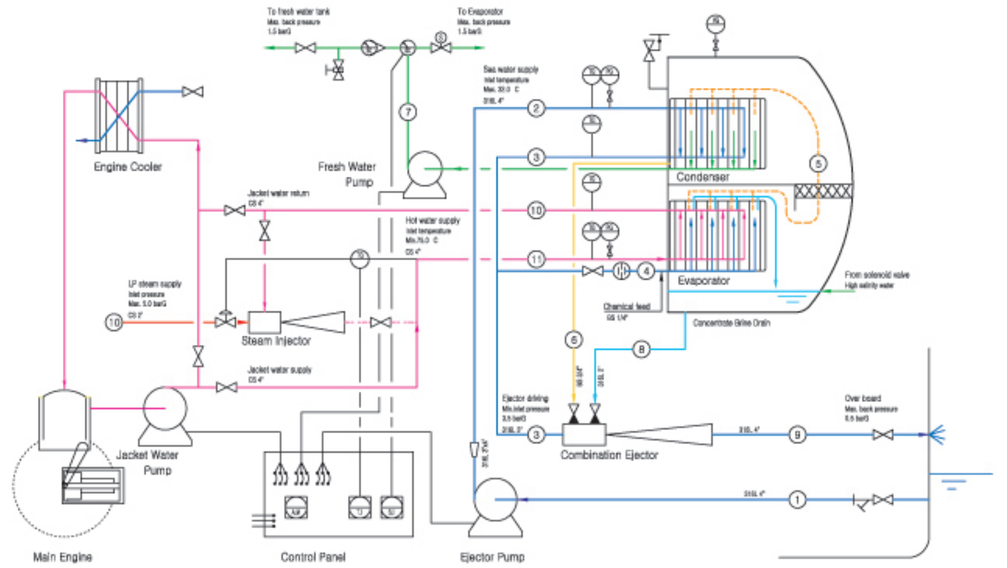
JULY 20, 2001

Operating Principle

DHP Engineering Co., Ltd.

DHP(Daewon Heat Plate) has been engaged in the fields of energy, environmental and process technology since 1978. With the development of the first Plate Heat Exchangers in 1979, wide range of experience in many different applications followed.
Today, DHP offers the largest selection of designs of Plate Heat Exchangers available with different surface areas, corrugations, plate materials, plate thickness and gaskets.
Our Plate Heat Exchangers meet the needs of virtually every industry requiring heat transfer including, chemical, power station, HVAC, beverage, Marine application, and Engine cooler.
With knowledgeable staff for the design, application and manufacture of Plate Heat Exchangers and thermal systems, DHP is the best choice for your heat transfer needs.

To achieve fresh water for drinking and washing, vacuum distillation system is normally use in the isolated place such as on ships or on islands. The DHP vacuum evaporating distiller utilizes heat from diesel engine coolant and LP steam by special steam jet heater.
The DHP vacuum evaporating distiller is base on the DHP' s titanium plate heat exchanger, one for evaporating of the heated brine and the other for condensing of the water vapor.
The vacuum chamber is kept by the seawater driven from condenser combination ejector. Heated seawater is used as feed water (brine) for the evaporating and evaporating temperature is controlled by vacuum pressure. Evaporating pure water vapor passes through deflector, demister and moving water droplets and then enters the condenser.
The pure water vapor condensed by cold seawater. The distillated pure water pumped out by fresh water pump and checked salinity. If the salinity exceeds the specified level, solenoid valve opens in the discharge line of the fresh water pump, this is automatic operation. The salinity exceeds distilling water is returned to evaporating chamber. More information, please refer to the diagram.



Benefits

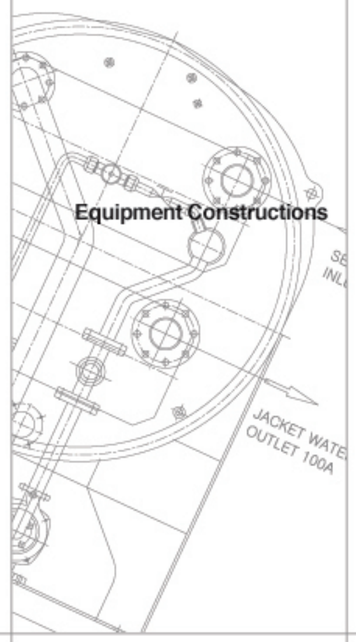
Reliable Water
- Superior purifying system with lower than 5ppm dissolved solids

Titanium Plates Heat Exchangers
- Sea water resistance material
- Low weight & Long life

Simple & Compact Design
- Low operation & maintenance costs
- Simple Installation

High Performance of Fresh Water Control System
- Low content of dissolved solids & salts is possible for supplying pure water
- Automatic operation

Equipment Constructions



Basic Equipment
- Titanium Plate Evaporator & Condenser
- Vacuum Vessel assembly
- Liquid jet combination ejector
- Fresh water pump
- Fresh water quality control system

Additional Equipment for Operation
- Cooling water supply pump
- Jacket water circulation pump
- Brine anti-scale chemical dosing unit (@ Jacket water temperature above 75℃)
- Extended control panel

Optional Equipment
- Steam jet heater & control assembly for steam boosting
- Extended control panel
- Fresh water disinfection unit

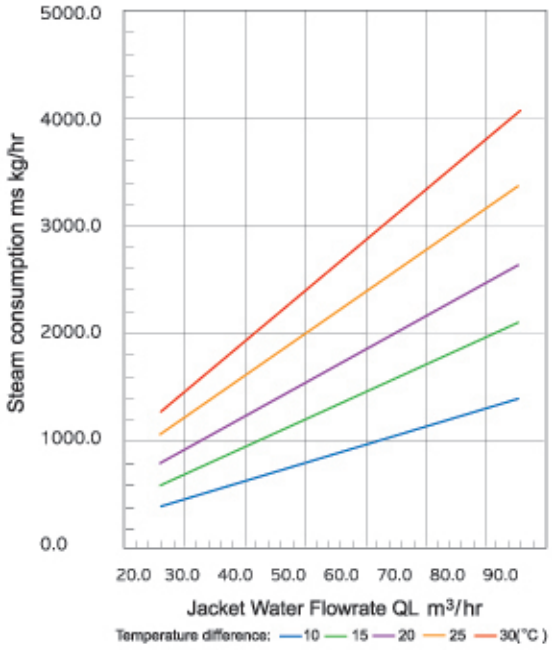
Flow Diagram for Two Stage Fresh Water Generator
① Sea-water supply into condenser
② Sea-water return from condenser
③ Driving supply for combination ejector
④ Brine supply
⑤ Flash vapor
⑥ Non-condensable gas outlet
⑦ Fresh water outlet
⑧ Concentrate brine drain
⑨ Discharge over board from combination ejector
⑩ Jacket water supply
⑪ Jacket water return
⑫ Heating steam supply

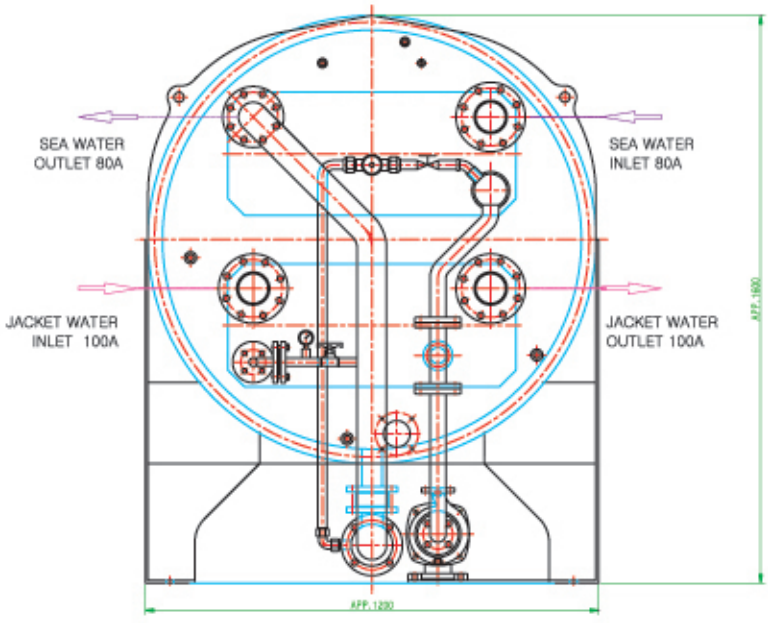
Boiling bubbles from brine
@ Evaporator by jacket water heating

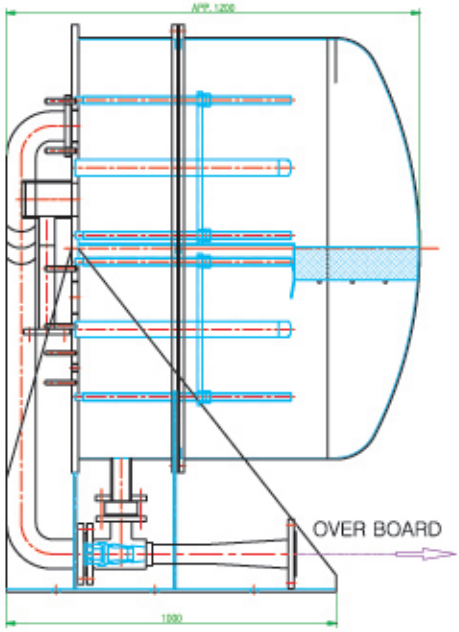
DHP Vacuum Evaporating Distiller

30TPD Type Single-Stage Fresh Water Generator

Steam Injection System







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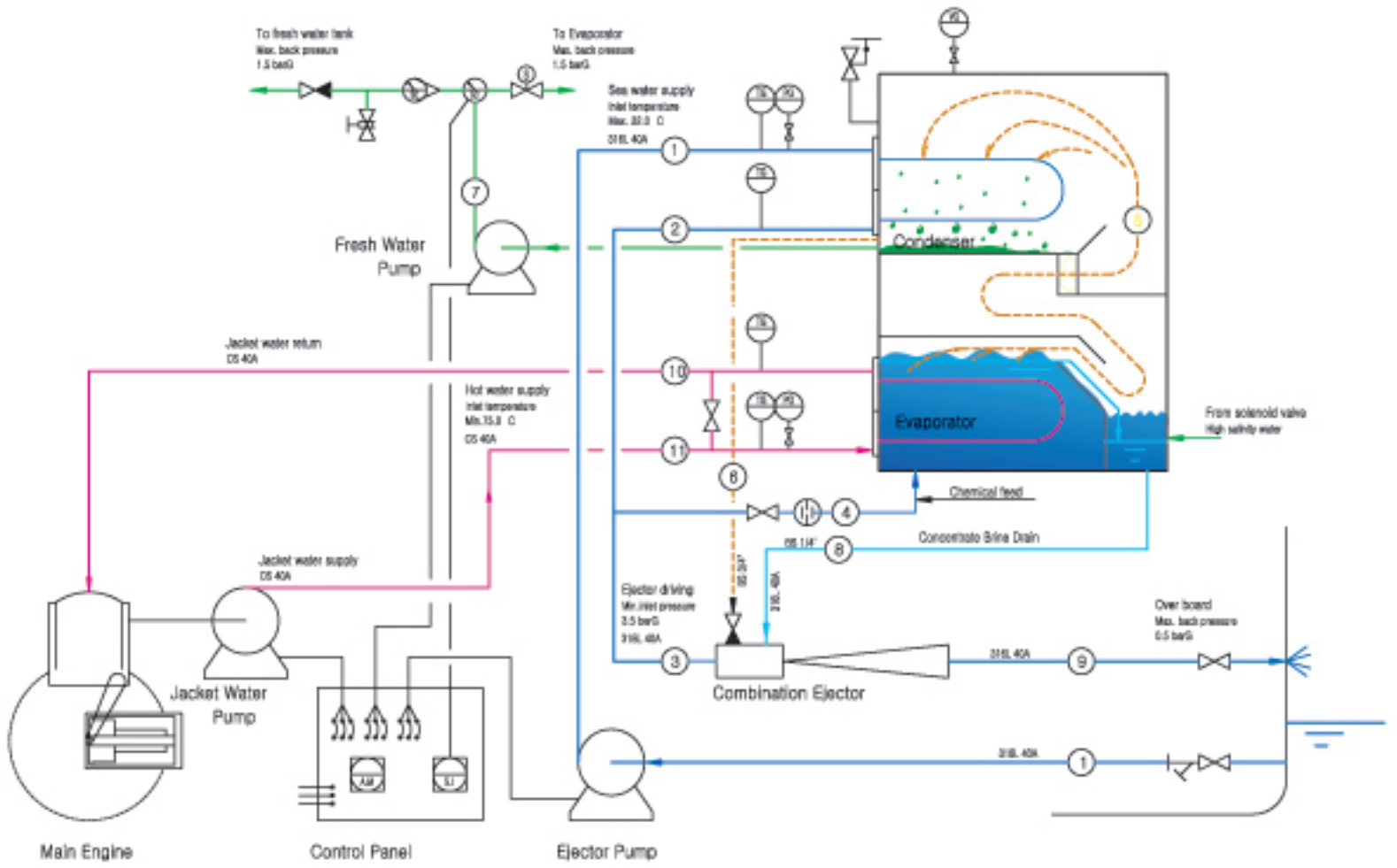
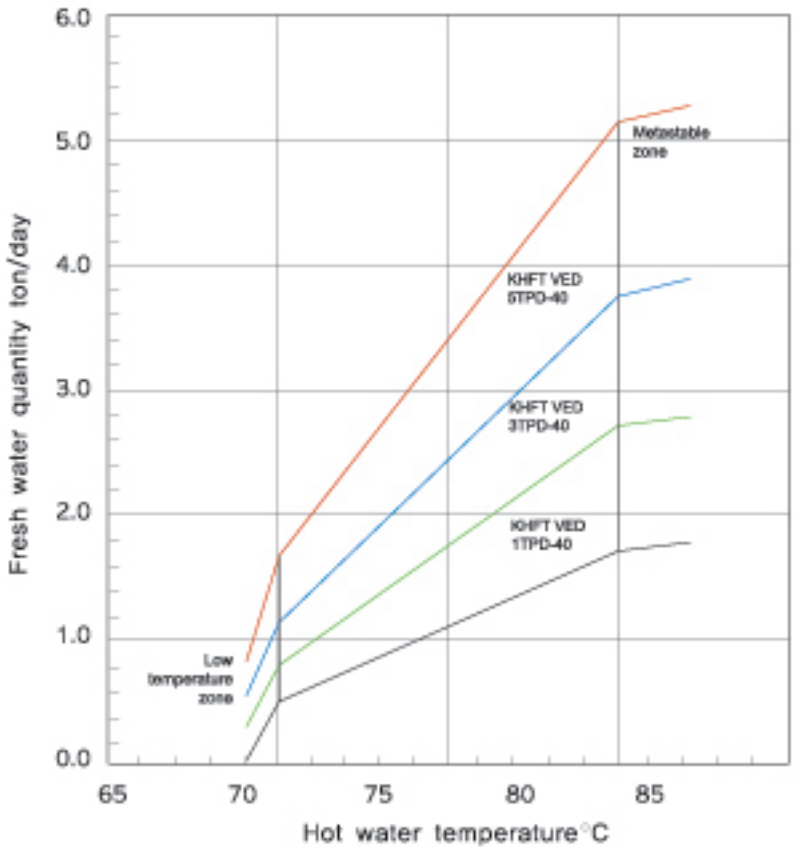
DHP Vacuum Evaporating Distiller

5TPD Type Single-Stage Fresh Water Generator



① Sea-water supply into condenser
② Sea-water return from condenser
③ Driving supply for combination ejector
④ Brine supply
⑤ Flash vapor
⑥ Non-condensable gas outlet
⑦ Fresh water outlet
⑧ Concentrate brine drain
⑨ Discharge over board from combination ejector
⑩ Jacket water supply
⑪ Jacket water return

Vacuum Evaporating Distiller Capacity



Utility Requirement Specification

MODEL	1TPD	3TPD	5TPD
Jacket Water			
Inlet temperature, ℃	min.70	min.70	min.70
Flow, m^3/hr	min.4.5	min.7.5	min.10
Sea Water(Ejector Driving)			
Inlet temperature, ℃	max.32	max.32	max.32
Inlet pressure, bar g	min.3.5	min.3.5	min.4.0
Flow, m^3/hr	min.10	min.10	min.12
Power Supply : 220, 380, 440V / 3PHASE / 50, 60Hz / 5KW			
Painting Color : Munshell no. 7.5BG 7/2			

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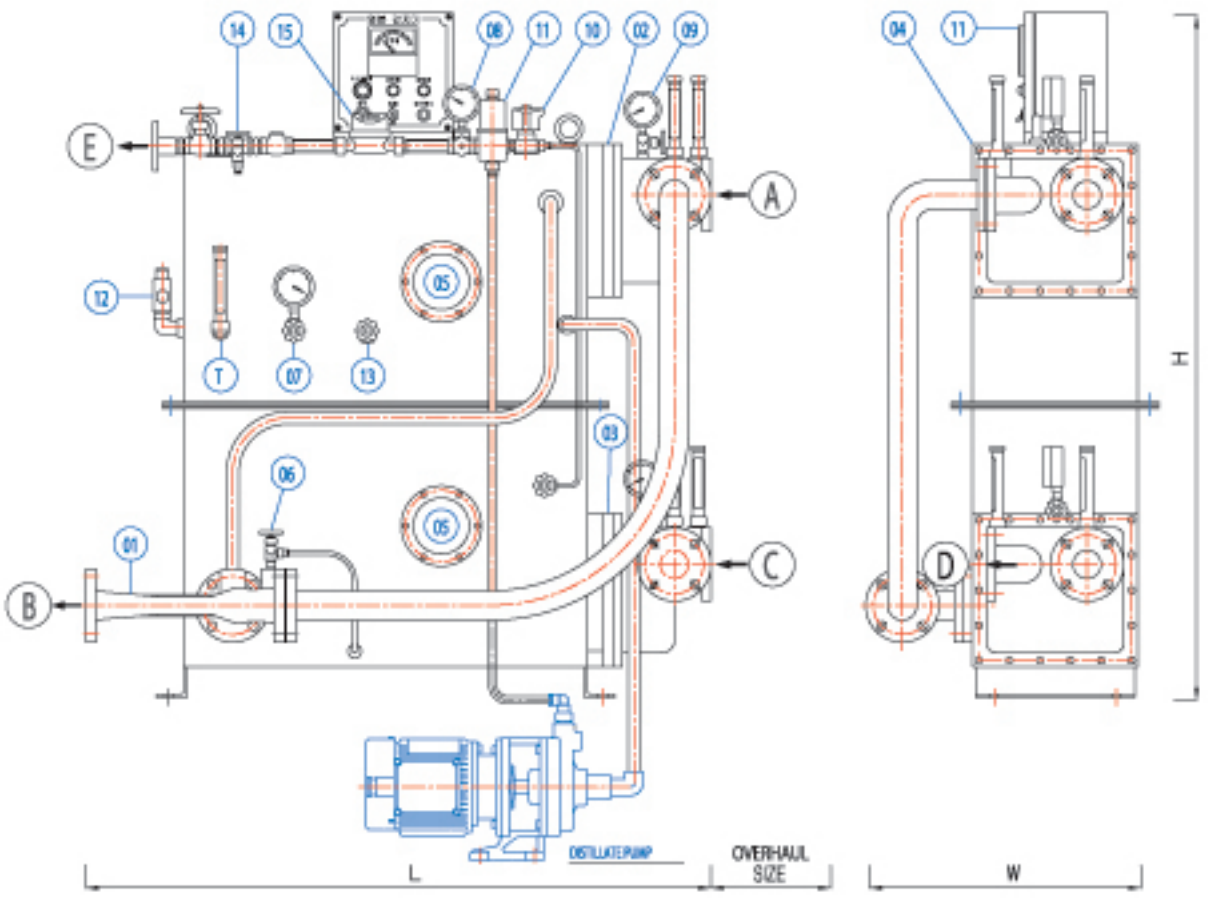
DHP Vacuum Evaporating Distiller

5TPD Type Single-Stage Fresh Water Generator



① Combination ejector
② Condenser tube bundle
③ Evaporator tube bundle
④ Sea water channel
⑤ Sight glass
⑥ Brine supply valve
⑦ Vacuum gauge
⑧ Compound gauge
⑨ Pressure gauge
⑩ Solenoid valve
⑪ Salinity indicator kit
⑫ Safety valve
⑬ Vacuum breaker
⑭ Sample test cock
⑮ Flow meter

Utility Requirement Specification

MODEL	Dimension			Weight	Overhaul Size
	L	W	H		
1TPD	760	410	960	110kg	170
3TPD	860	480	1120	160kg	240
5TPD	1020	480	1120	185kg	400

MODEL	Jacket Water		Sea Water		Fresh Water
	Supply	Return	Supply	Return	
1TPD	5k-40A	5k-40A	5k-40A	5k-40A	5k-15A
3TPD	5k-40A	5k-40A	5k-40A	5k-40A	5k-15A
5TPD	5k-40A	5k-40A	5k-40A	5k-40A	5k-15A

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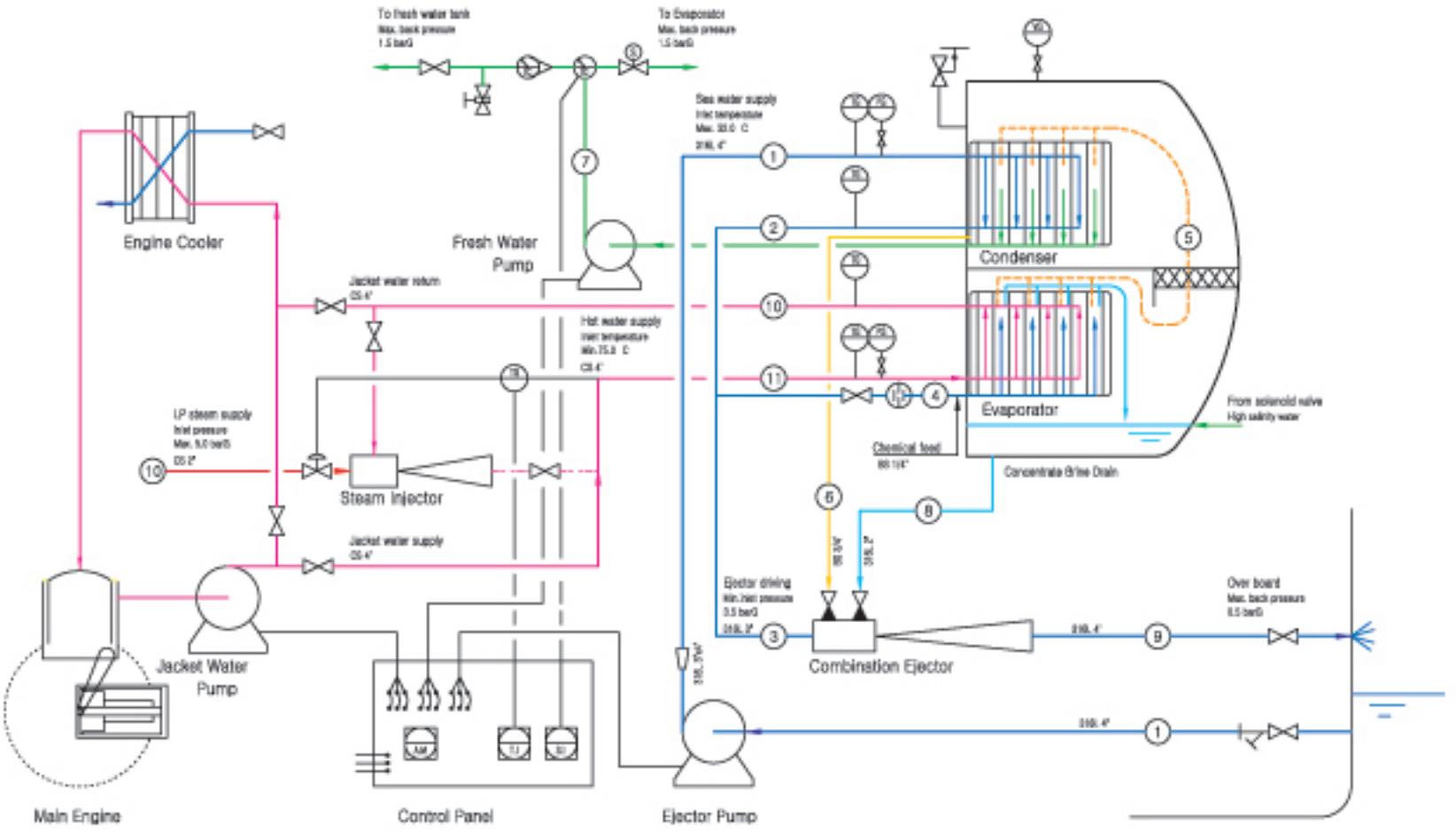
DHP Vacuum Evaporating Distiller

30TPD Type Single-Stage Fresh Water Generator



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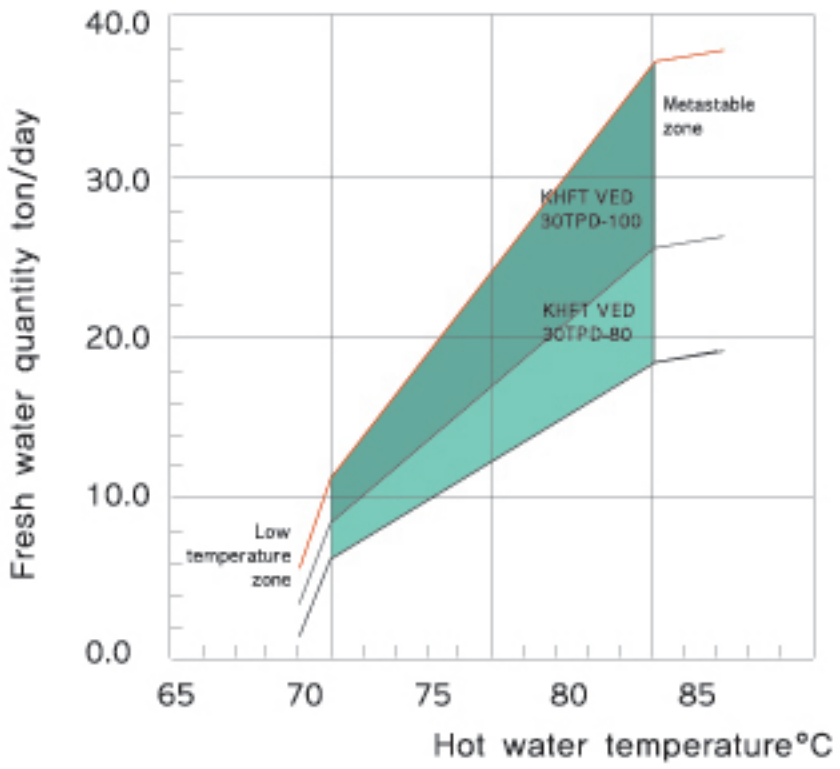
Vacuum Evaporating Distiller Capacity



Utility Requirement Specification

MODEL	30TPD-100	30TPD-80
Jacket Water		
Inlet temperature, c	min.70	min.70
Flow, m^3/hr	min.50	min.30
Sea Water(Ejector Driving)		
Inlet temperature, c	max.32	max.32
Inlet pressure, bar g	min.3.5	min.3.5
Flow, m^3/hr	min.80	min.60
Power Supply : 220, 380, 440V / 3PHASE / 50, 60Hz / 22KW		
Painting Color : Munshell no. 7.5BG 7/2		

DHP Engineering Co., Ltd.

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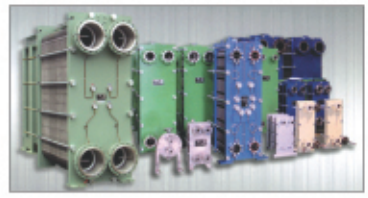
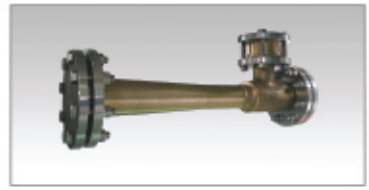


Plate Heat Exchanger



Combination Ejector

Fresh Water Pump