

Deaerator

Deaerator is defined as a mechanical device for removal of dissolved gases, especially oxygen and carbon dioxide from feedwater. And deaerator heat the feed water and maintain regular N.P.S.H of feed water pump. Spray & tray type is utilized for land-use deaerator, and stray & scrubber type is utilized for marine-use deaerator. Donghwa Entec developed major part like spray valve, tray, and scrubber and still research for more high efficiency of deaerator. Donghwa Entec has ability of thermal design, strength calculation, material procurement, and manufacturing.



Closed Cooling Water Cooler (CCW)

The function of a cooling system is to remove heat from cooling water of lubrication supply equipment of turbine's axis, sealed equipment of turbine's axis, hydrogen cooling equipment, cooling equipment of upper stator of generator, etc.



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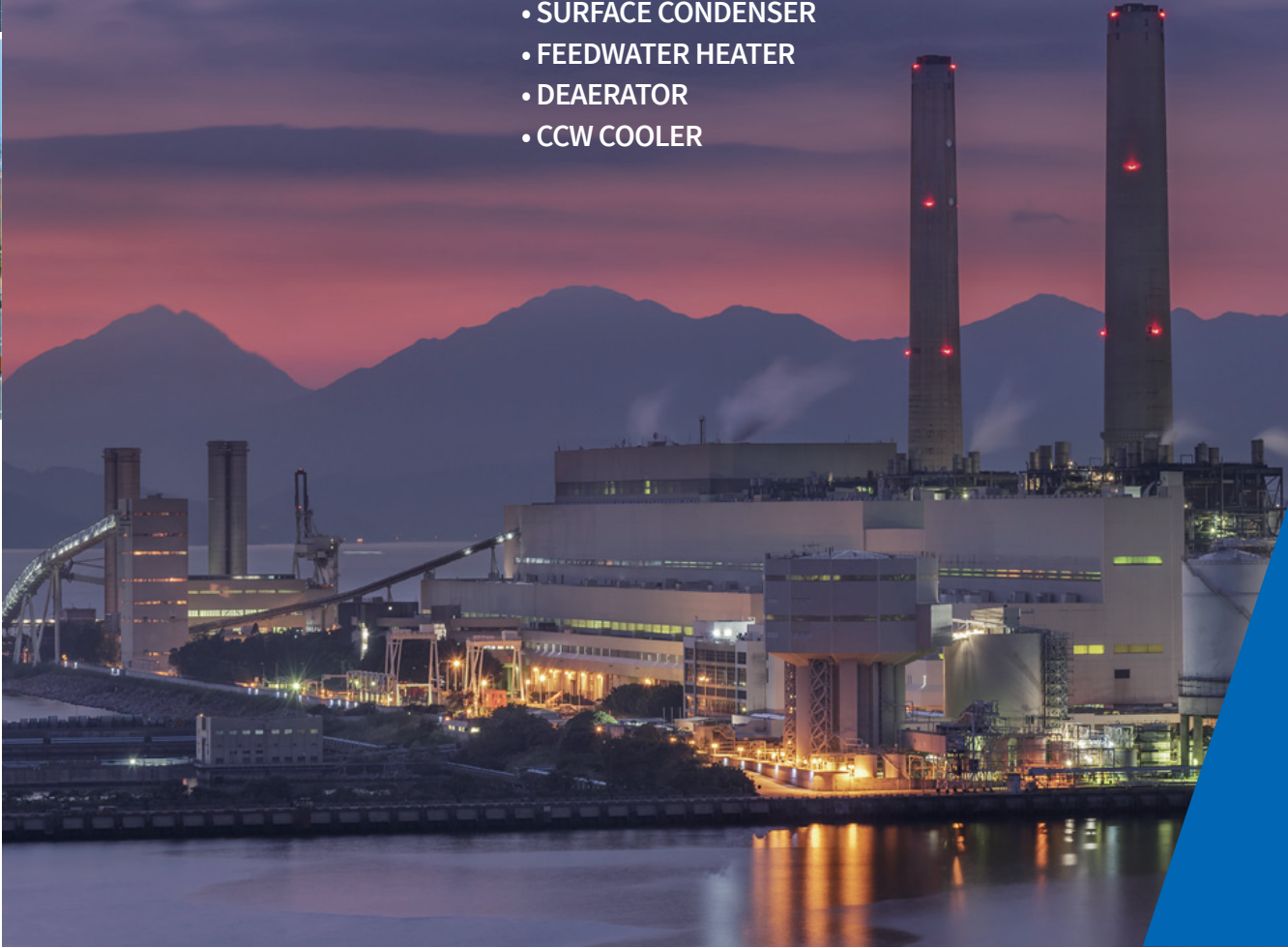
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Cryogenic Heat Exchanger and System Engineering Global Leader

Heat Exchanger for BOP for Power Plant

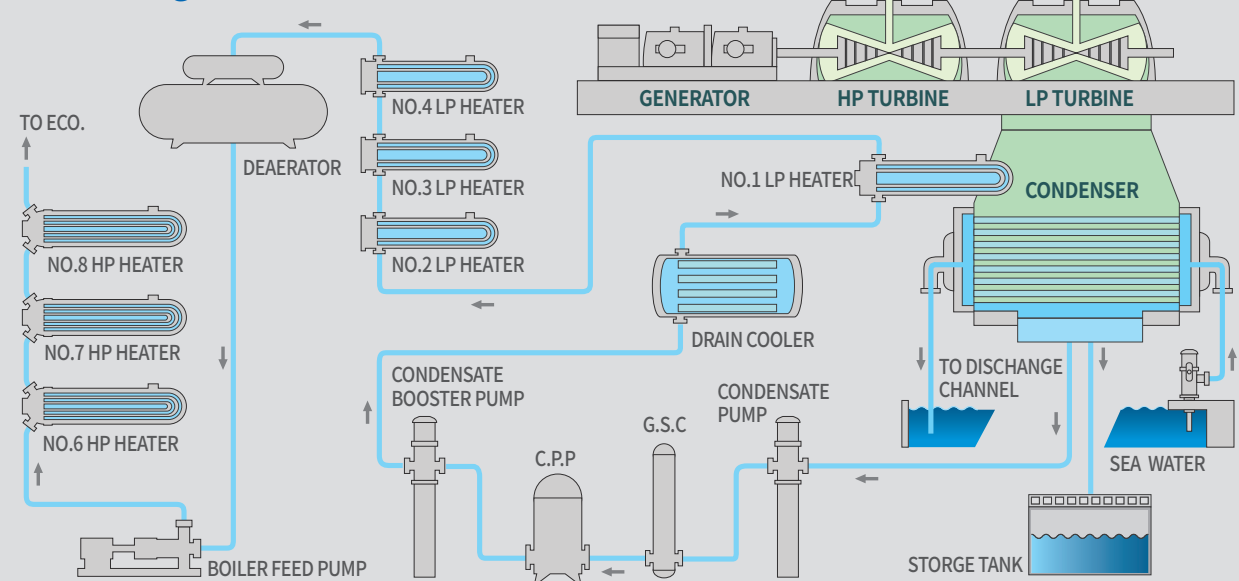
- SURFACE CONDENSER
- FEEDWATER HEATER
- DEAERATOR
- CCW COOLER



Heat Exchanger for BOP for Power Plant



● Flow Diagram



● List of Certificates

- ISO** International Organization for Standardization (9001, 14001)
- OHSAS** Occupational Health and Safety Management System (18001)
- ASME** American Society of Mechanical Engineers, USA (PP, S, U, U2)
- NATIONAL BOARD** The National Board of Boiler & Pressure Vessel Inspectors(PP, S, U, U2)
- KEPIC** Korea Electric Power Industry Code (MN)
- SELO** Manufacture License of Special Equipment People's Republic of China
- ANSI** American National Standard Institute, USA
- TEMA** Tubular Exchanger Manufacturers Association, USA
- DIN** Deutsche Industrie Normen, GERMANY
- JIS** Japanese Industrial Standard, JAPAN
- KS** Korean Industrial Standard, KOREA
- API** American Petroleum Institute



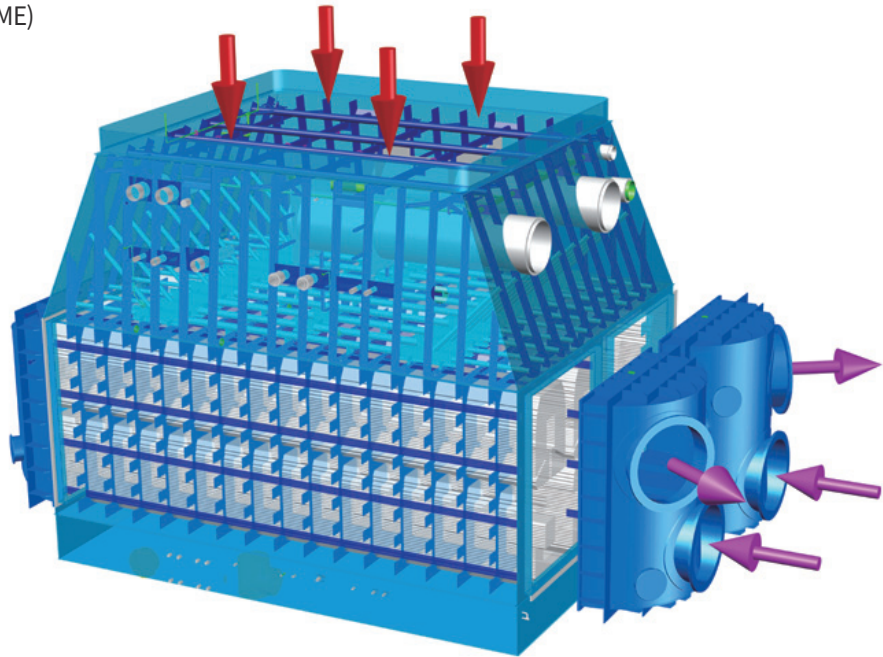
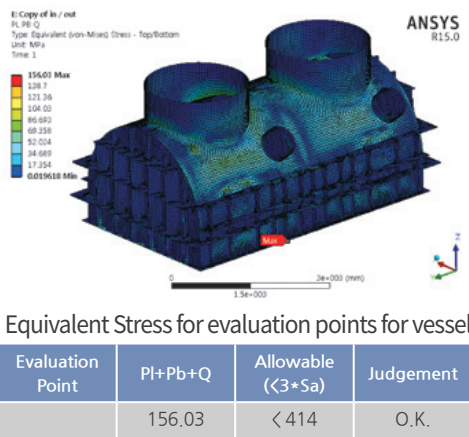
Surface Condenser

A steam surface condenser is a critical component of a power plant. The generating capacity of a power plant is dependent on the performance of the steam surface condenser. Condenser of DongHwa Entec is designed to provide the lowest back pressure which, in turn, maximizes the output from the power plant.

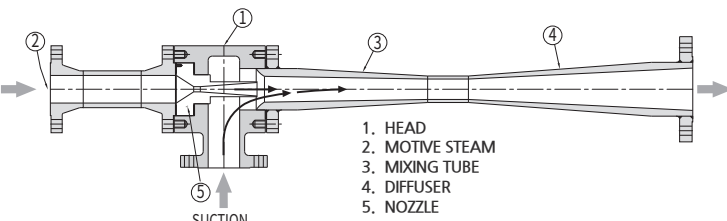
Each condenser is designed in accordance with the client's specifications to offer the highest thermal efficiency and structural integrity. The thermal, hydraulic and mechanical aspects of the condenser are designed using state-of-the-art technology.

The design is in accordance with the following codes and standards:

- Heat Exchange Institute (HEI)
- Electric Power Research Institute (EPRI)
- American Society of Mechanical Engineers (ASME)



● Ejector Vacuum System



The vacuum degree is decreased if the air is penetrated to vacuum surface condenser for turbine and result the decrease of power of turbine. Therefore steam driving ejector is necessary in order to remove air in vacuum surface condenser and ejector condenser is necessary in order to condense the driving steam. Usually ejector vacuum system is consisted of 1st ejector, inter condenser, 2nd ejector and after condenser. Comparing to vacuum pump, maintenance is not needed because there is not rotation machinery using electricity.

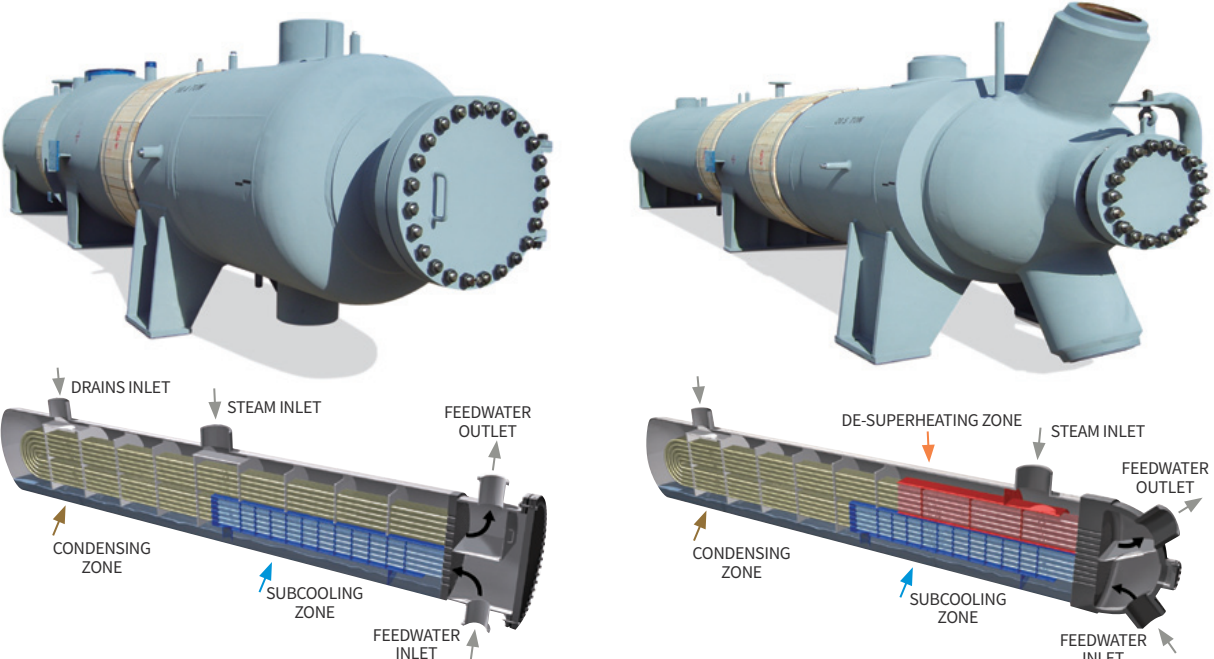
Donghwa Entec has testing system in R&D center and design and manufacture with our own developed computational program.

Feedwater Heater (HP/LP)

Regenerative heating of feedwater is essential to enhancing the efficiency of a power cycle. The feedwater is heated to the maximum permissible extent in a feedwater heater using controlled or uncontrolled extraction from the steam turbine.

The shell internals are equipped with adequate clearances to ensure proper distribution of steam throughout the entire length of the heater. The number of support plates and baffle plates is calculated such that steam velocities in the heater shell during normal and transient conditions are within acceptable limits and flow induced vibration is avoided.

Three zone feedwater heaters are equipped with a high efficiency desuperheating-zone. The cross-flow velocity is optimized to offer the highest heat transfer coefficient, minimal shellside pressure drop and zero incidence of flow-induced vibration. The subcooling zone is designed to offer the highest heat transfer coefficient, lowest shellside pressure drop and to eliminate condensate reheating and flashing.



● Vacuum Pump System

A typical liquid ring vacuum pump Air Removal System for steam condenser service consists of two identical 100% capacity pump skids. It is common practice to use both pumps simultaneously to evacuate or “hog” the condenser to the point where steam can be introduced into the turbine, then one pump shuts down while the other goes into “holding mode” to continuously remove air from the condenser during turbine operation.

In the air removal application, liquid ring vacuum pumps are employed to evacuate air and any other non-condensable gases from the main condenser that services a steam turbine. This gas removal is done for the purpose of eliminating the insulating effect that non-condensable gases have on the transfer of heat from steam through the tubes to the cooling medium. Without a vacuum system, air would severely reduce the efficiency of the heat transfer, resulting in the condenser surface area increasing many times for a given steam load.

