

Closed Cooling Water Heat Exchanger

KOREA Midland Power - Shinboryeong Thermal Plant Power Unit #1 and Unit #2

Each of Shinboryeong Units #1, #2 is producing a minimum 1000MW electrical output.



Closed Cooling Water Heat Exchanger is a device installed at the component cooling water system to cool purified cooling water for various equipment by using sea water during operating the power plant. Closed Cooling Water Heat Exchanger is to accomplish successful heat exchange to closed cooling water at the shell side when the sea water at the tube side passes through a number of tubes installed at the shell.

It is composed of the tubes, the tube sheet and installed baffle to control the flow of fluid at the shell side. The fluid at the shell side is to travel from the inlet nozzle, go through baffle and exit through the outlet nozzle. During this process, heat exchanges as the fluid contacts the tube. The fluid at the tube side is to inflow through the channel and exit after passing through the tube.

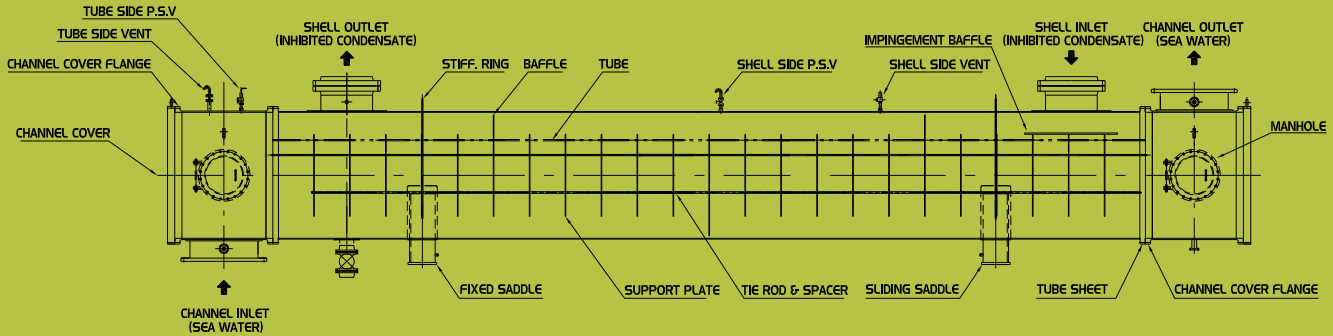
- **CLOSED COOLING WATER TUBE SHEET TYPE**

Fixed Tube Sheet Type, Shell & Tube Type is the simplest type Heat Exchangers. Production cost is inexpensive, but it is impossible to use corrosive fluid in the shell side.

Expansion Joint is required when temperature difference between the fluids at the shell side and tube side is greater than 100 °C or when the difference of the thermal expansion coefficients between shell and tube side is large.

Data		Shell Side	Tube Side
Design	Temperature	60 °C	60 °C
	Pressure	10.5 bar g	10.5 bar g/F.V
Hydro Test Pressure		13.65 bar g	13.65 bar g
Operating Temperature (IN/OUT)		41.59 °C / 35 °C	29.5 °C / 33.45 °C
Corrosion Allowance		3.2 mm	-
M.D.M.T		-18 °C	-18 °C

Structure of CCW Heat Exchanger



Functions of Key Components

- CHANNEL : Chamber to contain sea water before transferring the sea water to the tubes
- SHEEL : It protects the tube and baffle by wrapping them, inhibited condensate comes in. It is the chamber transferring the heat with the tube.
- BAFFLE : It makes velocity and flow of inhibited condensate.
- TUBE : It has function to exchange the heat between inhibited condensate outside the tube and the sea water flowing inside the tube.
- TUBE SHEET : It separates the sea water at CHANNEL Side and the fluid at SHEEL Side.

Equipment to prevent the corrosion for CCW Heat Exchanger

◆ CATHODIC PROTECTION SYSTEM

When the current inflows into the metal from the outside, negative potential gradually lowers as the current inflows into cathode with high potential; and when it becomes close to positive potential, negative potential and positive potential eventually become identical.

Before metal structure of the closed cooling water heat exchanger starts corroding, sacrificial electrode, called 'ANODE' corrodes firstly to protect the closed cooling water heat exchanger. This system functions under the principle above.

