

Loeffler Boiler: Definition, Parts, Working, Advantages, Disadvantages, and Applications [With PDF]

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Loeffler is another example of a water tube boiler. This is a high-pressure boiler which is up to 100 bar.

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Loeffler Boiler Definition:

Loeffler boiler is a water tube boiler used for generating steam by the burning of fuel which is coal and further that is used for the generation of power. It is another extension of the Lamont Boiler.

But the difference between Lamont and Loeffler boiler is the Loeffler boiler can generate steam with the use of saltwater and there is no problem of Salt and sediment under the boiler but in case of LaMont boiler it can generate steam from the saltwater there is a problem of salt and sediment under the boiler surfaces.

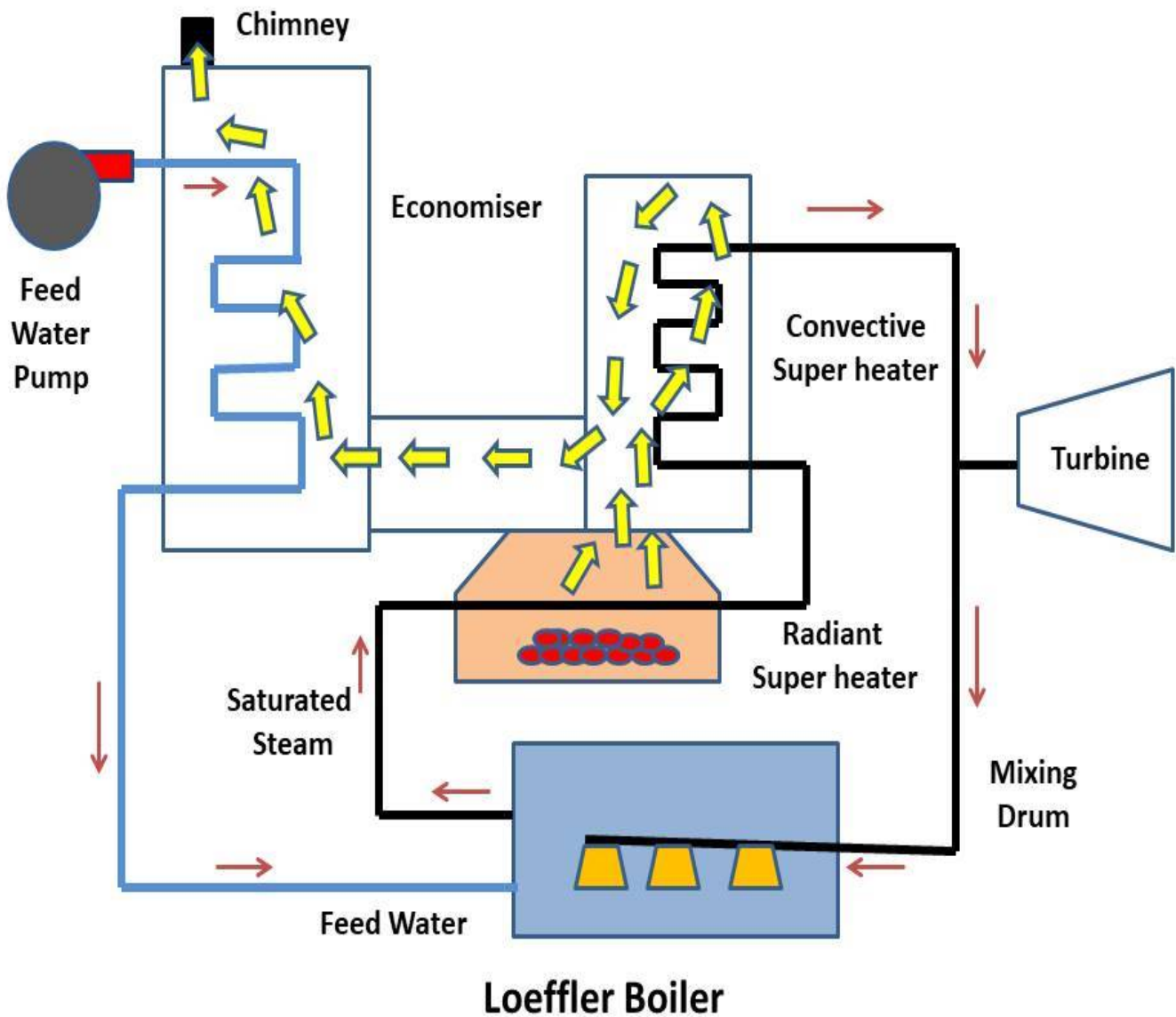
Loeffler boiler generates steam 100 tones per hour.

Parts or Construction of Loeffler Boiler:

The Loeffler boiler consists of several parts which are:

- *Water feed pump*
- *Air Preheater*
- *Blower*
- *Economizer*
- *Evaporating drum*
- *Steam circulating pump or centrifugal pump*
- *Radiant superheater*
- *Convection superheater*
- *Turbine*
- *Mixing nozzle*
- *Chimney*
- *Drain*

- Safety valve
- Water level Indicator
- Pressure gauge
- Fusible plug



Water feed pump:

The main function of the water feed pump is to supply the feed water into the system.

It can be used in the beginning or in between like the feed water coming from the turbine to condensate and more.

Air Preheater:

As the name Airpreheater, that means it heats the air before sending it to the combustion chamber.

The primary function of this device is used for increasing the efficiency of the boiler.

Blower:

Blower is also a heater type device that supplies the hot air.

Economizer:

An economizer is also used for increasing boiler efficiency.

The main function of the economizer is that it receives the waste heat of the boiler and transfer into the boiler feedwater that means there is no additional work required to generate and supply hot flue gases here.

In simple Economizer is used to preheat the water before sending it to the evaporating drum

Evaporating drum:

The main function of the evaporating drum is:

It is used to ***convert feedwater into saturated steam*** with the help of superheated steam from the superheater.

Steam circulating pump or Centrifugal Pump:

It works is to circulate the steam which is inside the boiler.

The location of this pump is in between evaporating drums and radiant superheater.

Radiant superheater:

Here it works as a chamber used for converting into superheated steam.

The location is near to the combustion chamber.

Convection superheater:

It is used to transfer heat from flue gases to steam. Here it heats up to the desired temperature up to 500 degrees Celsius.

Turbine:

The superheated steam is now sent to the turbine blade for rotation and the blade is attached to the shaft which also rotates and further, it is connected into the induction motor for the generation of electricity.

Mixing nozzle:

The location of the mixing nozzle is inside the evaporated drum.

It mixes the steam and feed water from the superheater and evaporates them.

Chimney:

The chimney is provided for exhausting the burnt gases to the atmosphere.

Drain:

The drain is also used to release the water when cleaning is required.

It is provided to the evaporating drum where the mixing of the superheated and water takes place.

The drain is open when the salts and sediments are settled in the drum.

Safety valve:

The safety valve is used for the safety of the boiler and Plants. It gives information about all the stuff which is needed to be done and so on.

The main function of the safety boiler is to release excess steam present in the vessel.

Water level Indicator:

A water level indicator gives the reading of water level in the boiler. When the water level is low or high it indicates or shows.

Pressure gauge:

The pressure gauge is used in this type of boiler to know the pressure. When it is low or high it shows.

Fusible plug:

It is provided to protect the boiler against the damage due to overheating.

This overheating occurs when a low level of water presents into the boiler. To overcome maintain the water level properly.

Pulverized coal:

Pulverized coal is used here as a working fuel. It is more efficient to produce heat.

Now come to working,

Working of Loeffler Boiler:

As we know this is a water tube boiler so water is in a tube and burn gases surround them.

The water is first to supply into the feed pump. From Feed pump, it goes to economizer.

An economizer is a preheating device so it heats the water. Now it comes into the evaporating drum.

Here mixing nozzle is there for mixing the steam and feed water.

Here water evaporates starts and then it sends to the combustion chamber.

In the combustion chamber, the pulverized coal is burning so it produces hot gases so water gets into saturated steam and furtherer so on.

From the combustion chamber, it sends it to the superheater.

In superheater, the saturated steam is converted into superheated steam(1/3rd used) which now can be used for rotating the turbine blade for the generation of electricity.

And the remaining amount (Which 2/3rd of steam generation)of steam is sent to the evaporating water.

And the burned gases now come into the economizer and some parts use and complete water leaves to the environment through the chimney.

This is how the Loeffler boiler works.

Advantages of Loeffler Boiler:

The advantages of Loeffler Boiler are:

- *Saltwater for the generation of steam is a major advantage of the Loeffler boiler.*
- *The boiler size is very compact.*
- *It does not create much sound.*
- *The deposition of salt sediment is eliminated here.*

Disadvantages of Loeffler Boiler:

The disadvantages of Loeffler boiler are:

- *The evaporating drum is costly and Bulky in size.*
- *Here bubble formation occurs which creates a problem of Heat transfer rate.*

Applications of Loeffler Boiler:

The main application of the Loeffler boiler is It can be used for power generation. Other industries like textile, Medical and so on.

Loeffler Boiler FAQ:

What is Loeffler Boiler?

It is a water tube boiler and It works on High pressure up to 100 bar.

What is Cornish Boiler?

Cornish is a fire tube boiler and a low-pressure boiler works up to 12 bar only.

Application of Loeffler Boiler?

It can be used for power generation. Other industries like textile, Medical and so on.

What is a High-Pressure boiler?

As the name itself, you can understand the boiler works on high pressure are known as a high-pressure boiler.

It includes a water tube boiler that works on high pressure.
