

Scotch Marine Boiler: Definition, Parts, Working, Types, Advantages, Disadvantages, Application [With PDF]

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Scotch marine boiler is a fire tube boiler. It is used for marine works. Why this boiler works only marine? Because as per need the several parameter Scotch marine boiler full fills all the parameters. Like,

- The efficiency is great.
- The size of this boiler is small and
- It can generate or produce steam from any type of water which is great advantages.

Page Contents

- Scotch Marine Boiler Definition:
- Parts or Construction of Scotch Marine Boiler:
- Working of Scotch Marine boiler:
- Types of scotch marine boiler:
- Advantages of Scotch marine boiler:
- Disadvantages of Scotch Marine Boiler:
- Application of scotch marine boiler:

Scotch Marine Boiler Definition:

Scotch marine boiler is a fire tube boiler that works is to produce steam from water and it is mainly used at marine.

Parts or Construction of Scotch Marine Boiler:

Scotch Marine Boiler consists of several parts and other accessories which are:

1. *Soot Blower*
2. *Pressure gauge*
3. *Main Hole*
4. *Safety Valve*
5. *Whistle valve*
6. *Boiler tubes*
7. *Furnace*
8. *Combustion chamber*
9. *Chimney*
10. *Smokebox*
11. *Boiler shell*



Scotch marine boiler

Let us know each one by one,

Soot Blower:

Soot means kind of dust.

It is used here for removing soot that is deposited at the internal surface of the boiler. If we do not remove it then boiler efficiency will decrease.

Pressure gauge:

This is an instrument. The main function of is pressure gauge is to measure the pressure of the boiler.

Main Hole or Manhole:

It is also called a manhole. why? Because from this hole a man(boiler specialist) enters when boiler parts get damaged so to change it for working properly.

Safety valve:

It gives information about boilers like pressure, water, heat and other substance used.

It is used when the main assigned instrument not works.

Whistle valves:

This is an instrument and used for producing a whistle when it reaches the limit as per set.

Boiler tubes:

Boiler tube is used for two purposes:

- Water
- Heat

Here in the boiler tubes, there is heat inside and water is surrounded them.

Furnace:

A furnace is provided here for the burning of fuel substance to generate heat and further use of that heat. In this type of boiler, each furnace has its own combustion chamber.

Combustion chamber:

Here the combustion of fuel takes place.

Here a number of the smoke tube is placed which is connected to directly chimney from the combustion chamber.

Smoke Box:

The smokebox is placed because here the smoke will come and collect it and sends to the chimney.

Chimney:

The chimney is mainly known for exhausting the smokes.

The exhaust gas or smoke is released here into the environment through this chimney.

Boiler shell:

Boiler shell is an important part of the boiler, It is made up of steel and has much strength and to protect internal parts of the boiler.

Now let's study how it works:

Working of Scotch Marine boiler:

The fuel is supplied through the fire hole and here the fire is provided to start burning of fuel to generate heat.

The burning fuel comes into the furnace and here remaining parts will burn completely.

The heat generated by burning of fuel now sends to the boiler tube which is under the boiler. Water is surrounded by the tube.

The heat generated is much high and due to that, even the tube gets hot.

Due to the heated tubes, the water starts getting heated and its phase is 1st water to saturated steam and saturated steam to superheated steam.

Which is now completely is the steam phase.

The steam now can be used for propelling the turbine and more.

The burned or exhaust gas further sends to the smokebox and from the smokebox further, it sends to the chimney and here it releases to the atmosphere.

Here several valves are used for several purposes.

Types of scotch marine boiler:

1. **Single-ended and**
2. **Double-ended marine boiler.**

Let us know one by one.

Single-ended scotch marine boiler:

The boiler length is up to 3.5 meters only.

It contains one to four furnaces and it enters from the front door of the boiler.

Double-ended scotch marine boiler:

The boiler length is up to 6 to 7 meters.

It contains 1 to 4 furnace each side which means both side front and back end we can set furnace.

Advantages of Scotch marine boiler:

- *The size of the boiler is not so big comparatively another boiler.*
- *The boiler efficiency is great.*

- *A cost-effective boiler.*
- *It can generate steam with the use of any type of water which is a major advantage.*

Disadvantages of Scotch Marine Boiler:

- *It cannot be used for large plants. Used for limited or small plants*
- *This is a fire tube boiler so the steam formation or generation quality is not much good comparatively water tube boiler.*
- *For output, more floor area is required.*
- *Load variation can not be controlled easily.*

Application of scotch marine boiler:

- *It is used at marine works.*
- *Or we can say it is used on ships.*

References:

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