

Locomotive Boiler: Parts, Working, Advantages, Disadvantages, and Application (With Diagram & PDF)

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As the name denotes “**Locomotive Boiler**” that means these types of boiler moves with a certain velocity. Generally, it moves with a velocity of 60 to 70 km/hour.

The construction of this is the same as any fire tube boiler with a little difference, and that differences I will mention below in this article.

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Locomotive Boiler:

The Locomotive Boiler is a **fire tube boiler** (I also wrote an [article on the Water tube boiler VS Fire-tube boiler](#) you may check that too).

It is a device that is used to create steam from water by using heat energy.

It is a **horizontal drum axis multi-tube boiler**.

The main function of it is to **generate high steam rate** because of that we see the **grate area of this type of boiler is quite big** also it has a **number of fire tubes for improving the steam producing rate**.

Also, you can see an **artificial steam jet draught** is present in this type of boiler for **increasing the heat transfer rate**.

In this type of boiler, the **stack** is used instead of a chimney and burnt gas or flue gasses are removed by this stack.

As the name suggests it is a locomotive boiler means it is movable so that we don't need to fit chimney in it, the flow of air over the stack removed the flue gases **due to the pressure difference between the grate and the outside**.

This type of boiler is capable of producing a high steam rate and hence it is **used for railway locomotive engines and in marines**.

This how a Locomotive Boiler looks like



Locomotive Boiler of DRB Class 50 locomotive (Image source: By Rabensteiner – Own work, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=4109685>)

Construction of Locomotive Boiler

A locomotive boiler is consists of the following parts:

- *Ashpan*
- *Blow off Valve*
- *Water level Indicator*
- *Pressure Gauge*
- *main Hole*
- *Regulator*
- *Boiler Tubes*
- *Smoke Box*

Let me discuss these things briefly.

Ashpan:

Ashpan is a tray fitted beneath a grate in which ashes can be collected and removed.

Blow off Valve:

The function of blow-off valve is to discharge mud and other sediments. It can also be used to the drain-off boiler water.

Water level indicator:

This is an instrument which is used in the boiler to indicate the level of water.

Pressure gauge:

This is also an instrument that shows the reading of the Boiler pressure.

Man Hole:

The manhole is like an entrance where people enter the boiler and changed the parts if necessary and or if it is damaged.

Regulator:

The regulator is a valve that regulates the steam through the main steam pipe for superheating.

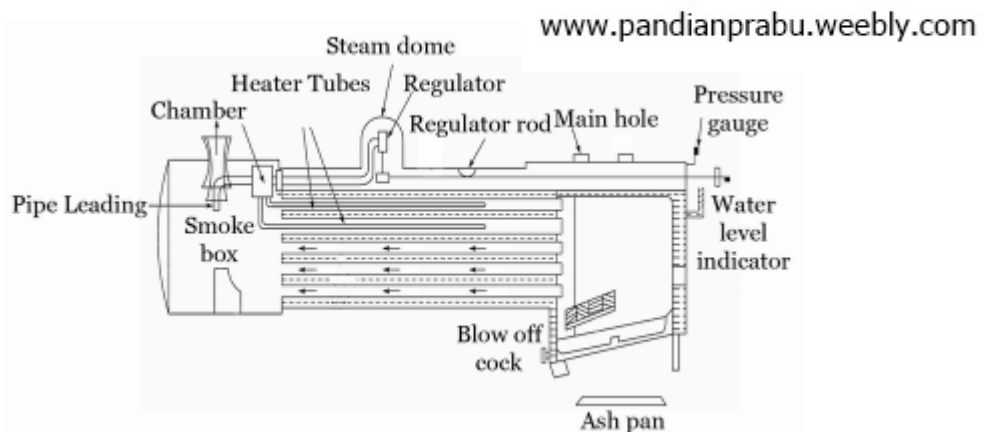
Boiler Tubes:

Here the tubes you are seeing in the diagram are the fire tubes through which the hot flue gases pass and exchange the heat with the surrounding water.

Smoke Box:

Smoke Box is a box in which the smoke of the burnt fuel after passing through the fire tubes gets collected and From there it is exhausted in the environment by the chimney.

Schematic Diagram of Locomotive Boiler:



Working Principle of Locomotive Boiler:

Using grate we **insert the fuel into the boiler** and then **providing the fire to ignite the fuel**.

When fuel starts burning the **hot flue gases are produced**. And these hot flue gases are passed through the pipe continuously until the surrounding water gets heated.

So the water changes there **phase into saturated steam**.

This saturated steam can also be used or else further heated for superheating.

Advantages of Locomotive Boiler:

These are the following advantages of Locomotive Boiler:

- *This is portable which means Locomotive Boiler can displace whenever required.*
- *It is capable of meeting sudden and fluctuating demands of steam.*
- *This is a cost-effective boiler.*
- *This Boiler has a high steam generation rate.*
- *It is compact in size.*

Disadvantages of Locomotive Boiler:

Here are some disadvantages of Locomotive Boiler:

- *It faces the problems of corrosion and scale formation.*
- *Unable to work under heavy load conditions because of overheating problems.*

Applications of Locomotive Boiler:

Locomotive Boilers are used in a different section like:

- *Locomotive boilers are mostly used in railways and marines.*
- *The efficiency of this locomotive boiler is very less.*
- *The locomotive boiler cannot work in heavy-load conditions because this leads to the overheating of the boiler and finally gets damage.*
- *This boiler is also used in traction engines, steam rollers, portable engines, and some other steam road vehicles.*

Summary:

What is a locomotive boiler?

A locomotive boiler is a device that is used to create steam from water by using heat energy. This is a horizontal drum axis, multi-tubular, natural circulation, artificial draft, forced circulation, medium pressure, solid fuel fired fire tube **boiler** that has an internal fire furnace

What is the function of the Locomotive Boiler?

The main function of it is to **generate high steam rate** because of that we see the **grate area of this type of boiler is quite big** also it has a **number of fire tubes for improving the steam producing rate**.

Why there is no chimney in a locomotive boiler?

In this type of boiler we use **the stack**, instead of a chimney because as the name suggests it is a locomotive boiler means it is movable so that we don't need to fit chimney in it, the flow of air over the stack removed the flue gases **due to the pressure**

difference between the grate and the outside.

Conclusion:

So here's our article end, as we already know it is a fire tube boiler and don't have a chimney but the mountings are the same as of any other boiler.

Although nowadays locomotive boilers are less use in railways, but in marines sill, it is used.

Reference:

- [Boiler by NTPEL](#)
- [Boiler Wikipedia](#)
- [Locomotive boiler and fire box](#) by LA Rehfuss – US Patent 1,764,981, 1930 – Google Patents

