

BENSON BOILER (SUPERCRITICAL BOILER)

The main difficulty experienced in the La Mont boiler is the formation and attachment of bubbles on the inner surfaces of the heating tubes. The attached bubbles reduce the heat flow

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Advantages

- As there is no drum, the total weight of Benson boiler is 20% less than other boilers. This reduces the cost of the boiler.
- Floor space requirements of Benson boiler are very less.
- Transportation of Benson boiler parts and its erection is very easy as there are no drums.
- Natural circulation boilers require expansion joints in pipes but the pipes in Benson boilers are welded.

Disadvantages

- As the Benson boiler operates at high pressure and temperature, special alloy materials are required.
- Maintenance costs are very high.
- This is more efficient, resulting in slightly less fuel use.

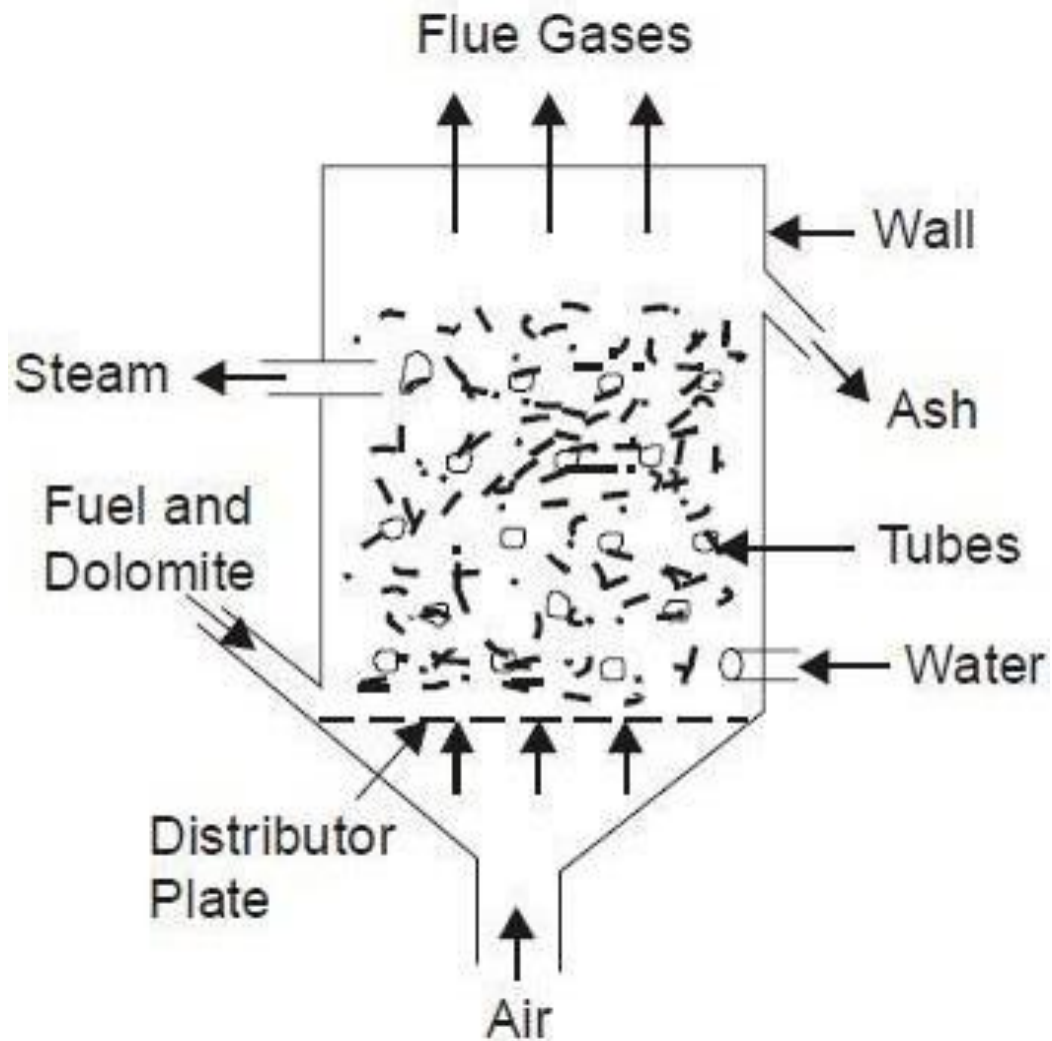
FLUIDISED BED COMBUSTION (FBC)

Burning of pulverised coal has some problems such as particle size of coal used in pulverized firing is limited to 70-100 microns,

the pulverised fuel fired furnances designed to burn a particular cannot be used other type of coal with same efficiency, the generation of high temp. about (1650 C)in the furnace creates number of problems like slag formation on super.

Fluidised Bed combustion system can burn any fuel including low grade coals (even containing 70% ash), oil, gas or municipal waste. Improved desulphurisation and low NOX emission are its main characteristics.

The fuel and inert material dolomite are fed on a distribution plate and air is supplied from the bottom of distribution plate. The air is supplied at high velocity so that solid feed material remains in suspension condition during burning. The heat produced is used to heat water flowing through the tube and convert water into steam.



Various advantages of FBC system are as follows:

- FBC system can use any type of low grade fuel including municipal wastes and therefore is a cheaper method of power generation.
- It is easier to control the amount of SO₂ and NO_x, formed during burning. Low emission of SO₂ and NO_x will help in controlling the undesirable effects of SO₂ and NO_x. During combustion. SO₂ emission is nearly 15% of that in conventional firing methods.
- There is a saving of about 10% in operating cost and 15% in the capital cost of the power plant.
- The size of coal used has pronounced effect on the operation and performance of FBC system. The particle size preferred is 6 to 13 mm but even 50 mm size coal can also be used in this system.

BOILER MOUNTINGS AND ACCESSORIES

Boiler Mountings These are the fittings, which are necessarily mounted on the boiler itself and mandatorily required for the safe and proper operation of boiler. Various boiler mountings are being discussed here one by one.

Water level indicator

Function

Water level indicator is fitted outside the boiler shell to indicate the water level in the boiler through a glass tube. In any type of boiler, water should remain at the designed level. If the water falls below the level due to change of phase into steam and simultaneously fresh water does not fill in by some reason, the hot surface may expose to steam only and overheat.

This is because the heat transfers co-efficient of steam is very less as compared to water. Due to overheat, damage of tube surface may occur. To avoid this situation, level of water in the boiler needs to be constantly monitored & maintained by boiler operator by keeping watch on water level indicator.

Construction

two horizontal tubes made of gun metal extend from the boiler shell in such a way that top one is connected to steam space and bottom one is connected to water space of the boiler.

These are connected at the other end by a vertical glass tube contained in a hollow casting in such a way that water and steam come out in the glass tube and their interface is visible through it. Each gun metal tube is also provided with a cock to control the flow of water/steam to the glass tube. One drain cock is fitted at the bottom for cleaning purpose. The horizontal metal tubes also contain one metal ball each which normally rests on a hemispherical groove in the tubes. In case the water/steam rush with high speed as may be if glass tube breaks by accident, this ball lifts up from its normal position and block a hole which connects the metal tube with glass tube and stops the flow.



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