

Steam Boiler

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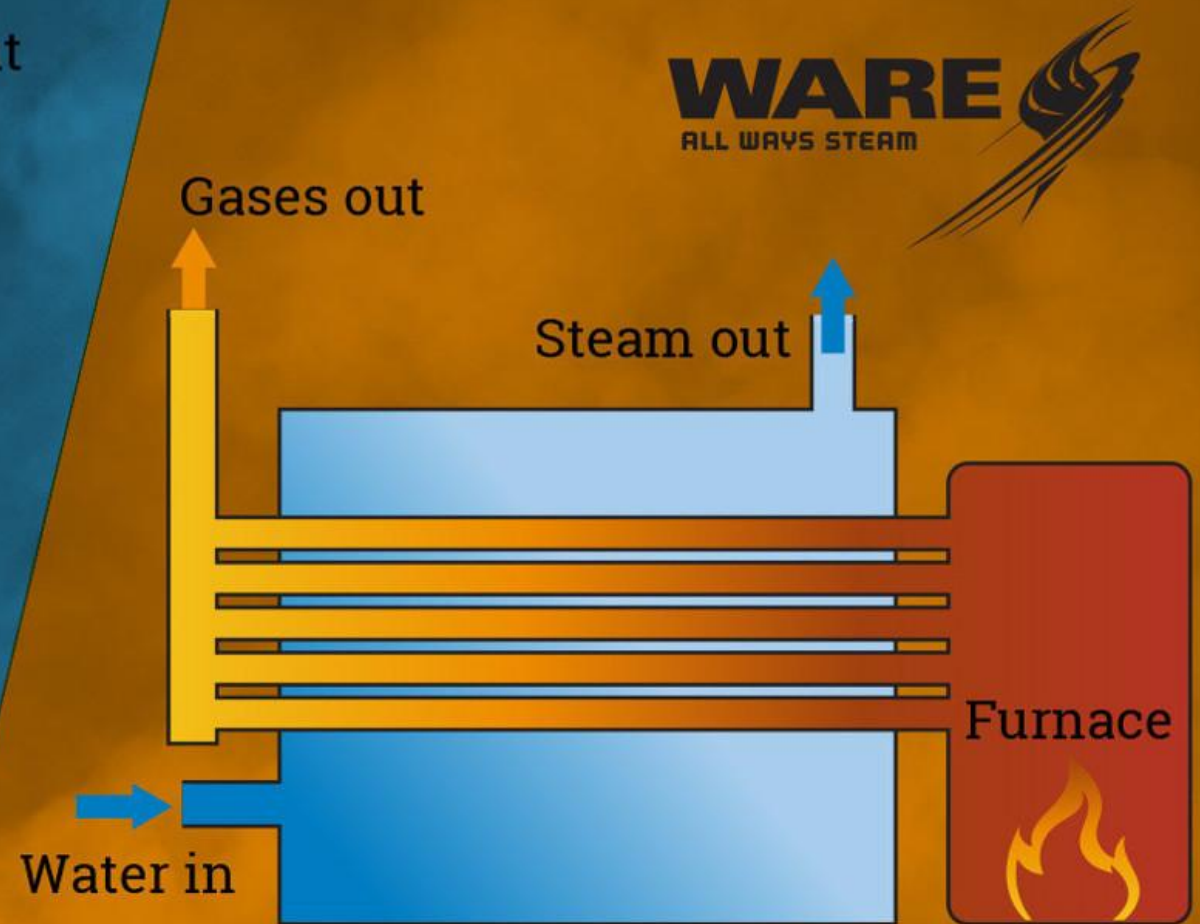
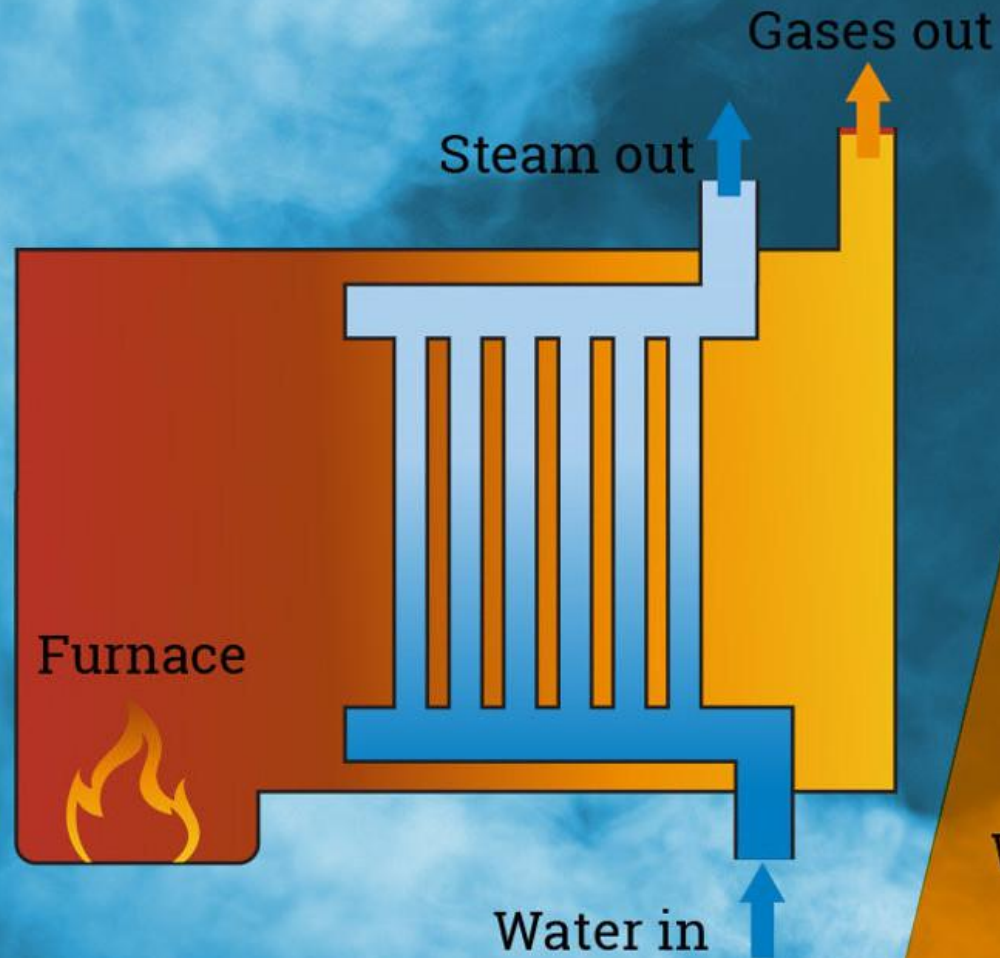
Introduction

- Steam boiler is a closed vessel in which heat produced by the combustion of fuel is utilized to generate steam from water, at desired temperature and pressure.
- According to IBR (Indian Boiler Regulation) boiler is defined as “Boiler is a closed pressure vessel with capacity exceeding 22.75 liters used for generating steam above 1 bar pressure and 100⁰C temperature.
- The steam produced may be supplied:

For generating power in steam Engine or steam turbines.

- ✓ At low pressures for industrial process work in cotton mills, sugar factories, etc.
- ✓ For producing hot water for supply of hot water and for heating the buildings in cold weather.nerating steam under pressure.”

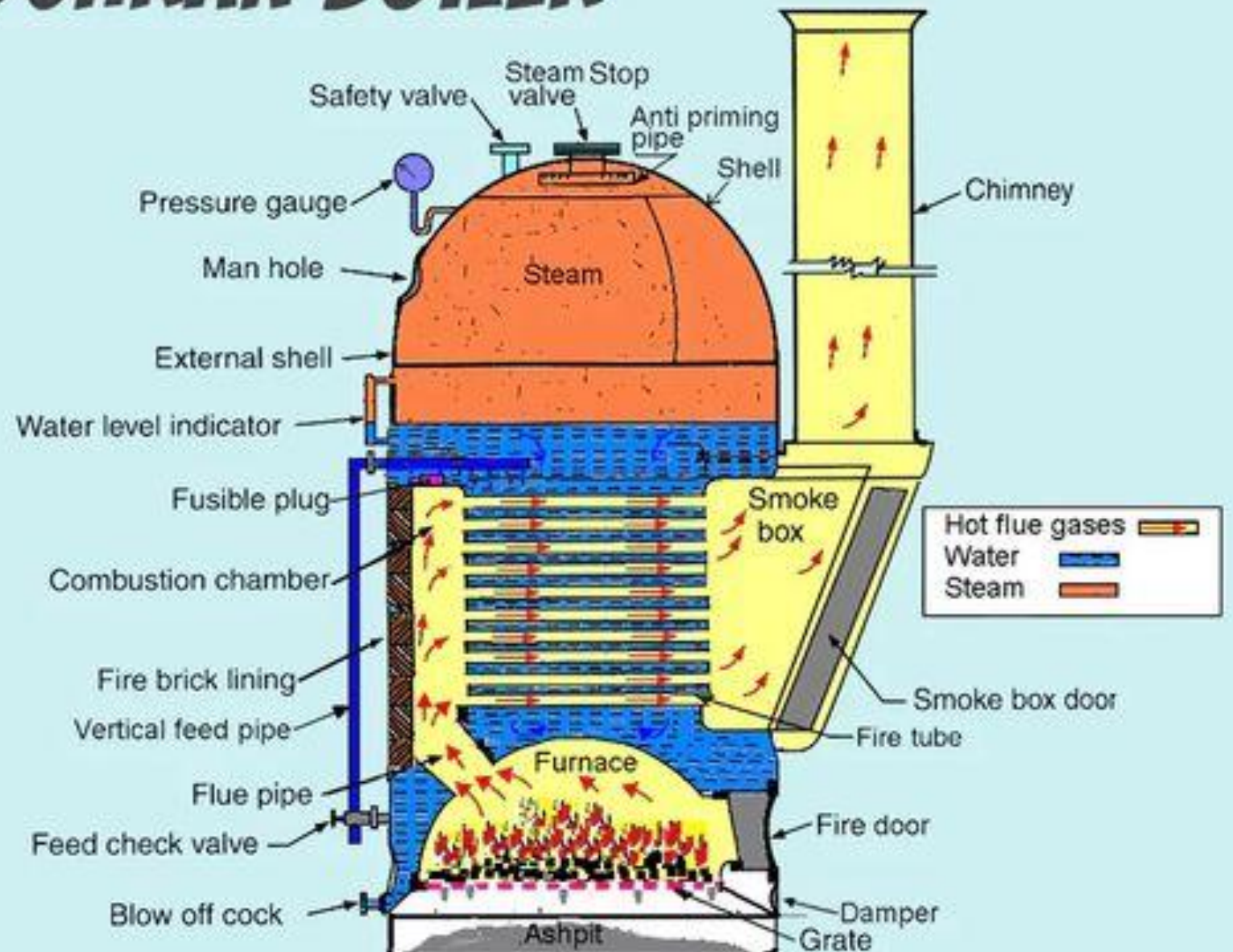
WATER TUBE - VS - FIRE TUBE BOILERS



Comparison between Fire tube and Water tube boiler

Sr. No.	Particular	Fire Tube boiler	Water tube boiler
1	Position of water and hot gases	Hot gases inside the tubes and water outside the tubes	Water inside the tubes and hot gases outside the tubes
2	Operating pressure	Limited to 25 bar	More than 125 bars
3	Rate of steam generation	Lower	Higher
4	Suitability	Not suitable for large power plant	Suitable for large power plant
5	Chance of explosion	Less due to low pressure	More due to low pressure
6	Floor space requirement	More	Less
7	Cost	Less	More
8	Requirement of skill	Required less skill for efficient and economic working	Required more skill and careful attention efficient and economic working
9	Use	For producing process steam	For producing steam for power generation as well as process heating.
10	Scale deposition & over heating	There is no water tubes, no problem of scale deposition and less problem of overheating & bursting	Small deposition of scale will cause overheating and bursting of the tubes.

COCHRAN BOILER



Specification

Shell diameter = 2.75 m

Height = 5.75 m

Working pressure = 6.5 bar

Heating surface area 120 m²

Steam capacity = 3500 kg/hr (Max. = 4000 kg/hr)

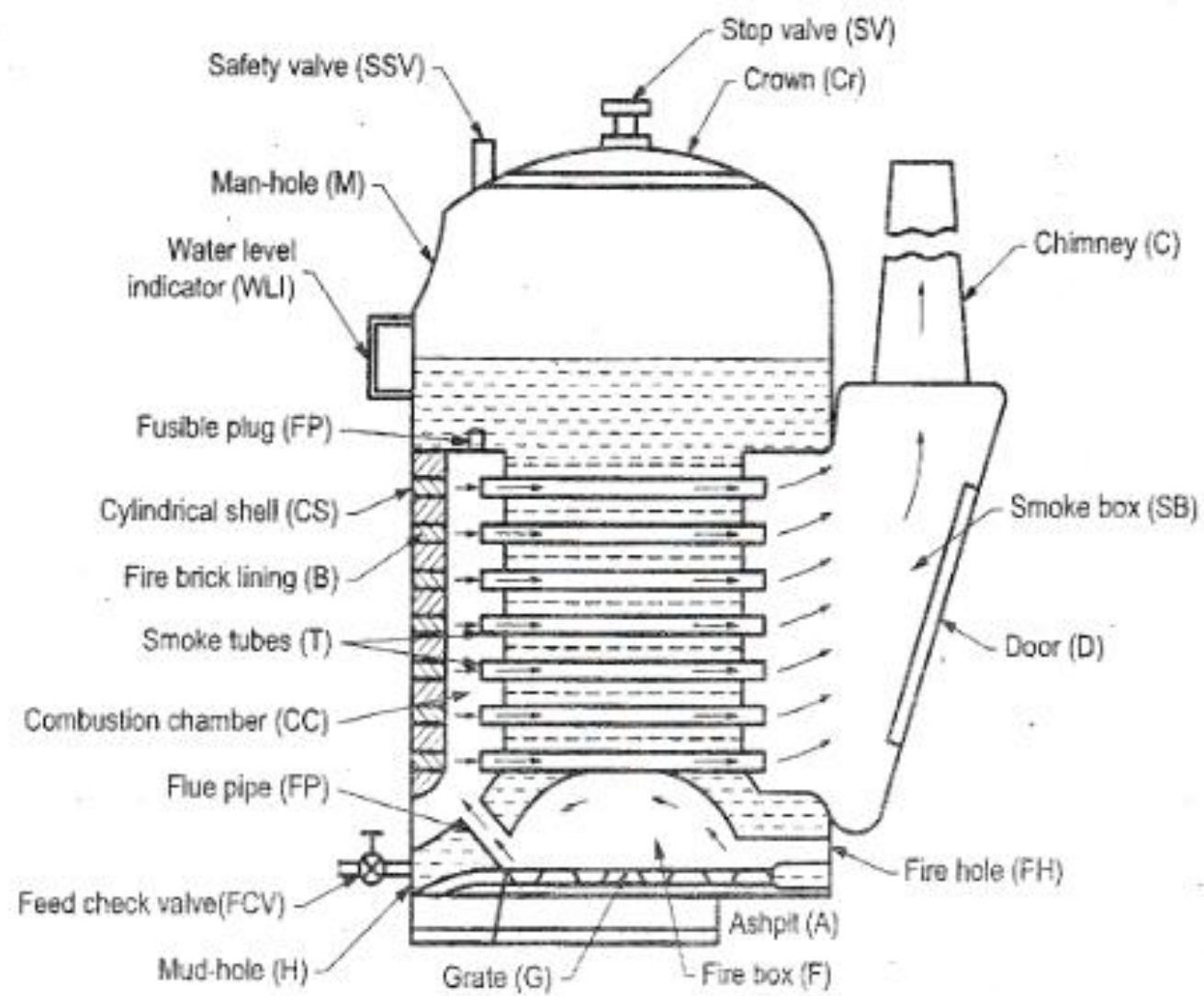
Efficiency = 70 to 75 %

Advantages

1. It is compact and portable boiler therefore minimum floor area is required.
2. Initial cost of boiler is less
3. It can be moved and set up readily in different locations.
4. Quick and easy installation.
5. Any type of fuel can be used. (Coal or Oil)

Disadvantages

1. Steam raising capacity is less due to vertical design.
2. Water along with steam may enter the steam pipe under heavy loads due to small steam space.
3. Efficiency is poor in smaller sizes.



Lancashire Boiler

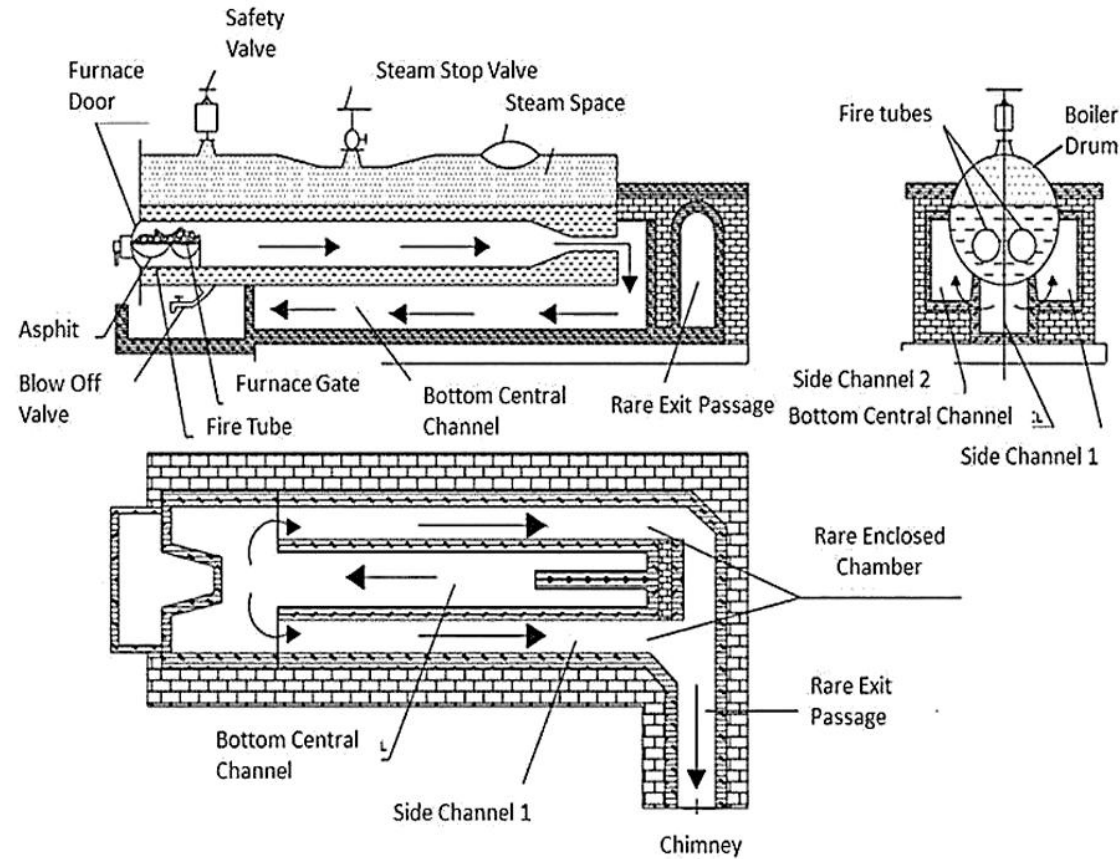


Figure 6.2 Lancashire Boiler

Babcock and Wilcox boiler

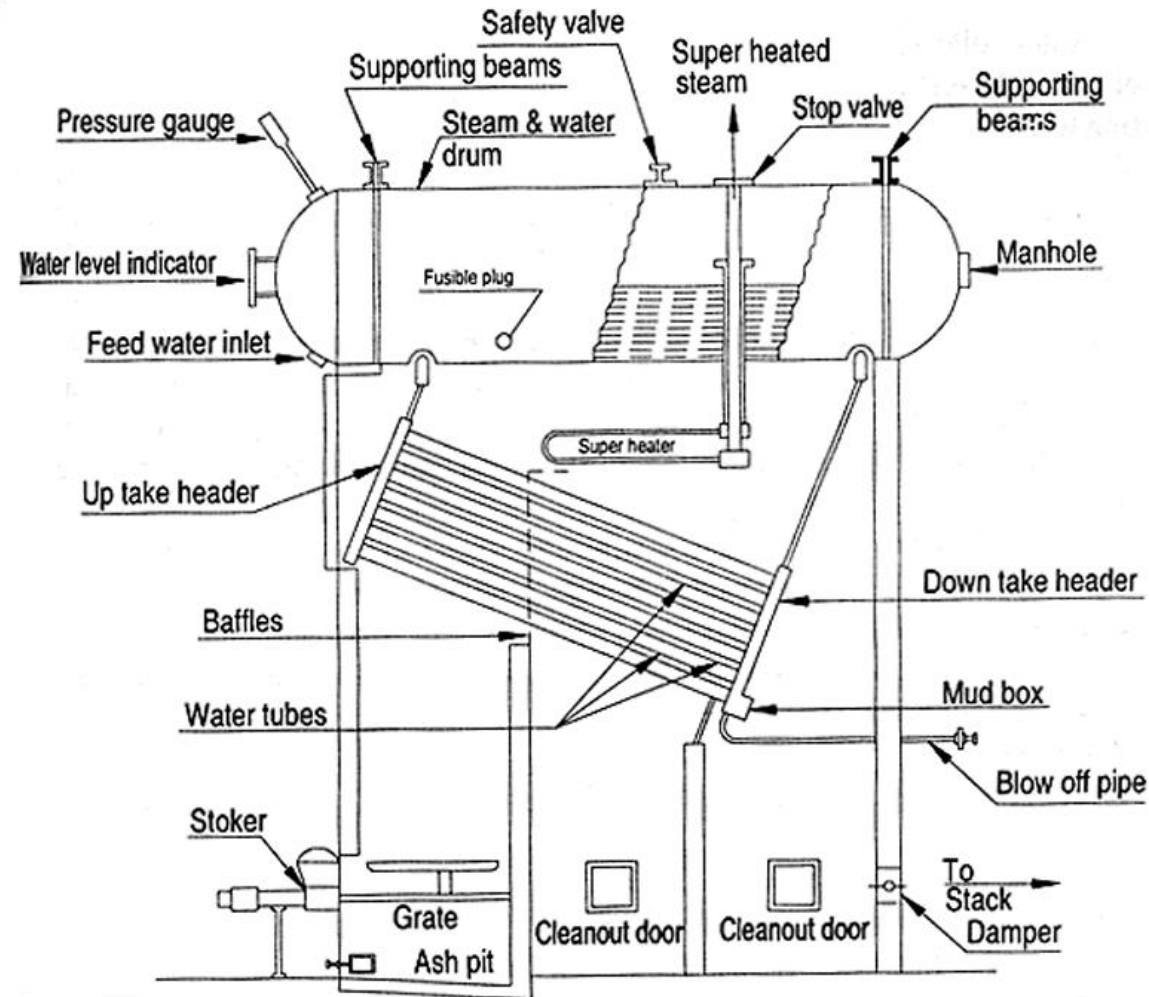


Fig. 6.3 Babcock Wilcox Boiler