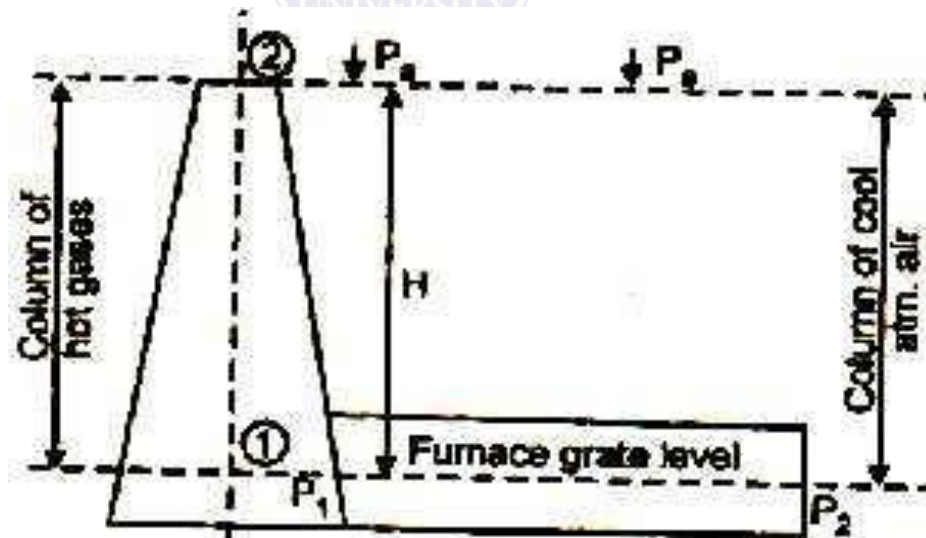


- Artificial Draught

- Natural Draught:

## Natural Draught:

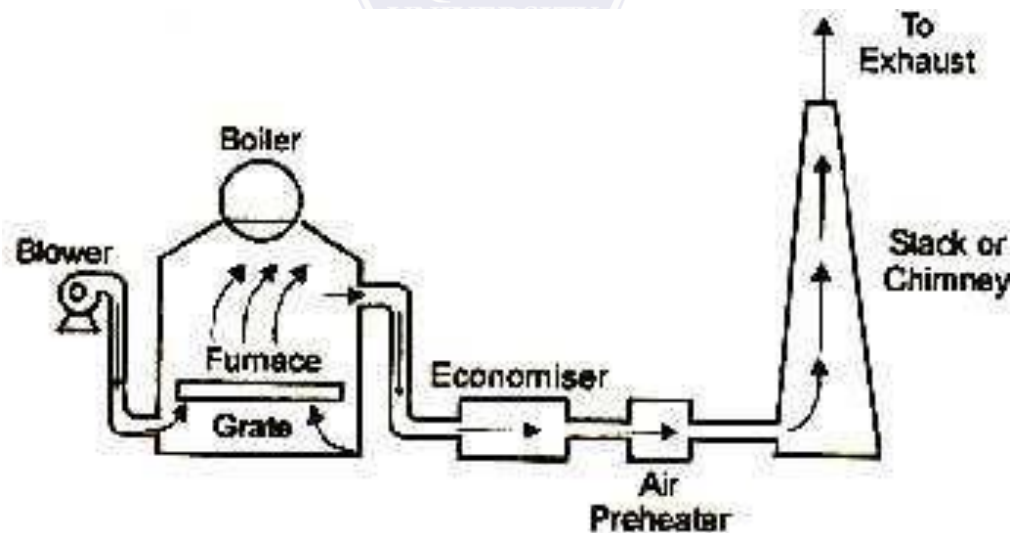
Natural draught system employs a tall chimney as shown in figure. The chimney is a vertical tubular masonry structure or reinforced concrete. It is constructed for enclosing a column of exhaust gases to produce the draught. It discharges the gases high enough to prevent air pollution. The draught is produced by this tall chimney due to temperature difference of hot gases in the chimney and cold external air outside the chimney.



## Artificial Draught

It has been seen that the draught produced by chimney is affected by the atmospheric conditions.

It has no flexibility, poor efficiency and tall chimney is required. In most of the modern power plants, the draught used must be independent of atmospheric condition, and it must have greater flexibility (control) to take the fluctuating loads on the plant.



## Forced Draught

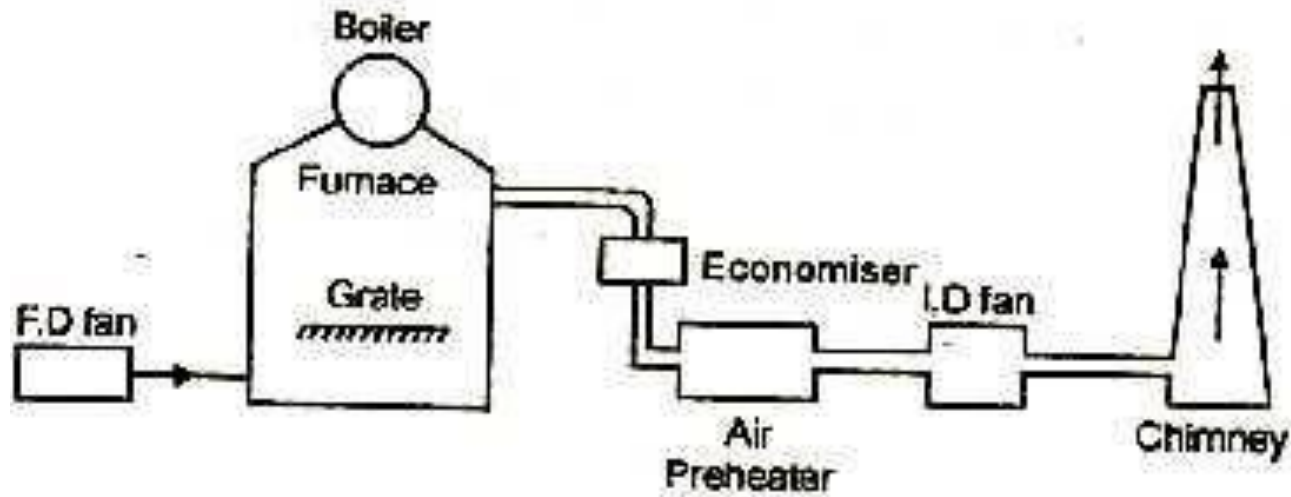
In a forced draught system, a blower is installed near the base of the boiler and air is forced to pass through the furnace, flues, economizer, air-preheater and to the stack.

This draught system is known as positive draught system or forced draught system because the pressure and air is forced to flow through the system.

### Balanced Draught:

It is always preferable to use a combination of forced draught and induced draught instead of forced or induced draught alone. If the forced draught is used alone, then the furnace cannot be opened either for firing or inspection because the high pressure air inside the furnace will try to blow out suddenly and there is every chance of blowing out the fire completely and furnace stops.

If the induced draught is used alone, then also furnace cannot be opened either for firing or inspection because the cold air will try to rush into the furnace as the pressure inside the furnace is below atmospheric pressure. This reduces the effective draught and dilutes the combustion.



## Air Pre-heaters

- They are simply heaters that heat the air before it enters the combustor, thence result in the fuel consumption and increasing the thermal efficiency.
- The fuel savings are nearly directly proportional to the air temperature rise in the pre-heater. Typical savings are 4% for a 2000F air temperature rise and about 11% for a 5000F temperature rise in the pre-heater.

•Air pre-heater are also a requirement for the operation of pulverized-coal furnaces to dry that fuel.to heat [air](#) before another process (for example, combustion in a boiler) with the primary objective of increasing the thermal efficiency of the process. They may be used alone or to replace a recuperative heat system or to replace a steam coil. In particular, this article describes the combustion air pre heaters used in large boilers found in thermal power stations producing electric power from e.g. fossil fuels, biomass or waste.

## Types

There are two types of air pre heaters for use in steam generators in thermal power stations:

One is a tubular type built into the boiler flue gas ducting,

And the other is are regenerative air pre heater. These may be arranged so the gas flows horizontally or vertically across the axis of rotation.

## Construction features:

Tubular pre heaters consist of straight tube bundles which pass through the outlet ducting of the boiler and open at each end outside of the ducting. Inside the ducting, the hot furnace gases pass around the pre heater tubes, transferring heat from the exhaust gas to the air inside the pre heater.



RAMA  
UNIVERSITY

[www.ramauniversity.ac.in](http://www.ramauniversity.ac.in)

FACULTY OF ENGINEERING &  
TECHNOLOGY