KHALSA® Air Pollution Control Device ™

DESIGNING & MAINTAINING ONLY THE BEST

KHALSA
COAL PULVERIZING PLANTS

"Upscaling energy efficient technology in steel rolling mill industry in India"

AIR POLLUTION CONTROL SYSTEMS FOR STEEL RE-ROLLING MILL INDUSTRY

ABOUT STEEL RE-ROLLING MILL

Steel Re-rolling is a major steel section and bar producing technology used in India and abroad. Since its inception in India with setting up of first Re-rolling Mill in Kanpur in 1928, this technology has contributed significant steel making capacity in secondary steel sector in India.

It has some Distinct Characteristics:

- Low Project Capital Cost
- Low Fuel efficiency
- Provides choice to end user with variety of product at lower cost.
- Can be set up near source which saves transportation cost of raw material.

MANUFACTURING PROCESS

Steel Re-rolling Process starts with cutting of billets in desired lengths. These are then loaded at pusher platforms from where they are pushed into the furnace. The Furnace may be coal fired, oil fired or even gas fired. In the furnace, billets are heated upto 1200 deg C and they become red hot for further rolling process which now consists of stage wise rolling of steel. They are transported to rolling stands and rolled into desired shapes. The rolled structure is then cooled and taken to the yard. Flue gases are generated during heating of billets in the furnace. The characteristics and volume of these gases mainly depends upon type of fuel used in the furnace. These flue gases need proper treatment for removal of dust particles/gases before being discharged into the atmosphere.

AIR POLLUTION

Depending upon the fuel used in heating the furnace of a Steel Re-rolling Mill, the characteristics of flue gases may vary. For coal fired furnaces they may consist of gaseous as well as particulate pollutants. For oil or gas fired furnaces, these flue gases may consist of just gaseous pollutants. The flue gases may also be corrosive in nature

CAPACITY CALCULATION OF REQUIRED EQUIPMENT

The volumetric capacity of Air Pollution cannot be judged as such but fair engineering estimation can be made with input data like:

- Furnace Capacity
- Fuel Consumption

CHARACTERISTICS OF AIR POLLUTION GENERATED AT FURNACE

- Pollutant: Dust & Gases such as NOx, SO_2, CO, CO_2
- Concentration: SPM - 1200-1500 mg/Nm^3 (Maximum, in coal fired)
  SO_2 - 800-1000 mg/Nm^3
  NO_x - 20-50 mg/Nm^3
- Temperature : At Suction Point: 250-300 ° C
- Nature of Dust: Slightly Sticky, Non Abrasive and Non Explosive
- Nature of Gases: Corrosive

CONTROL PRACTICES

The Control Practice adopted in controlling air pollution in this industry mainly depends upon following parameters:

- Dust/Gas Concentration at Inlet
- Discharge Standards
- Temperature of Flue Gases
- Nature of Pollutant i.e. Dust (Particulate) or Gaseous
- Nature of Dust i.e. Sticky, Abrasive
- Nature of Gases i.e. Corrosive, Non Corrosive

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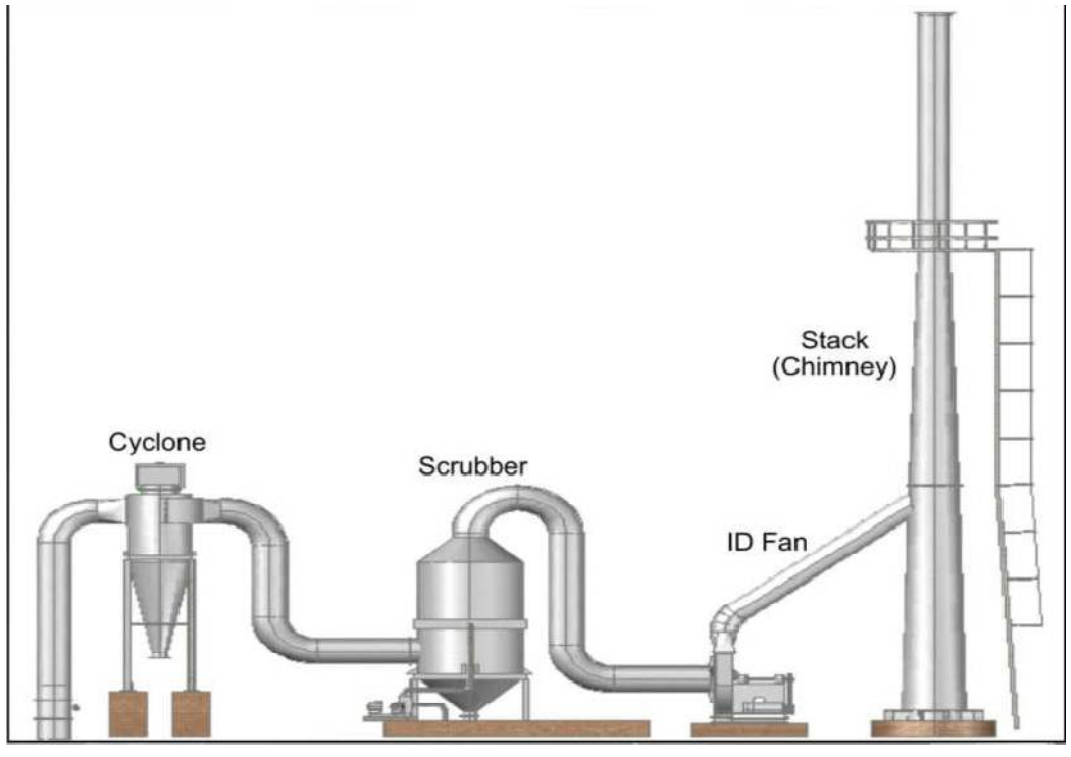
SELECTION OF TECHNOLOGY FOR EQUIPMENT

Selection of Technology for Equipment in an Air Pollution Control System in case of a Steel Re-rolling Mill depends upon the fuel to be used:

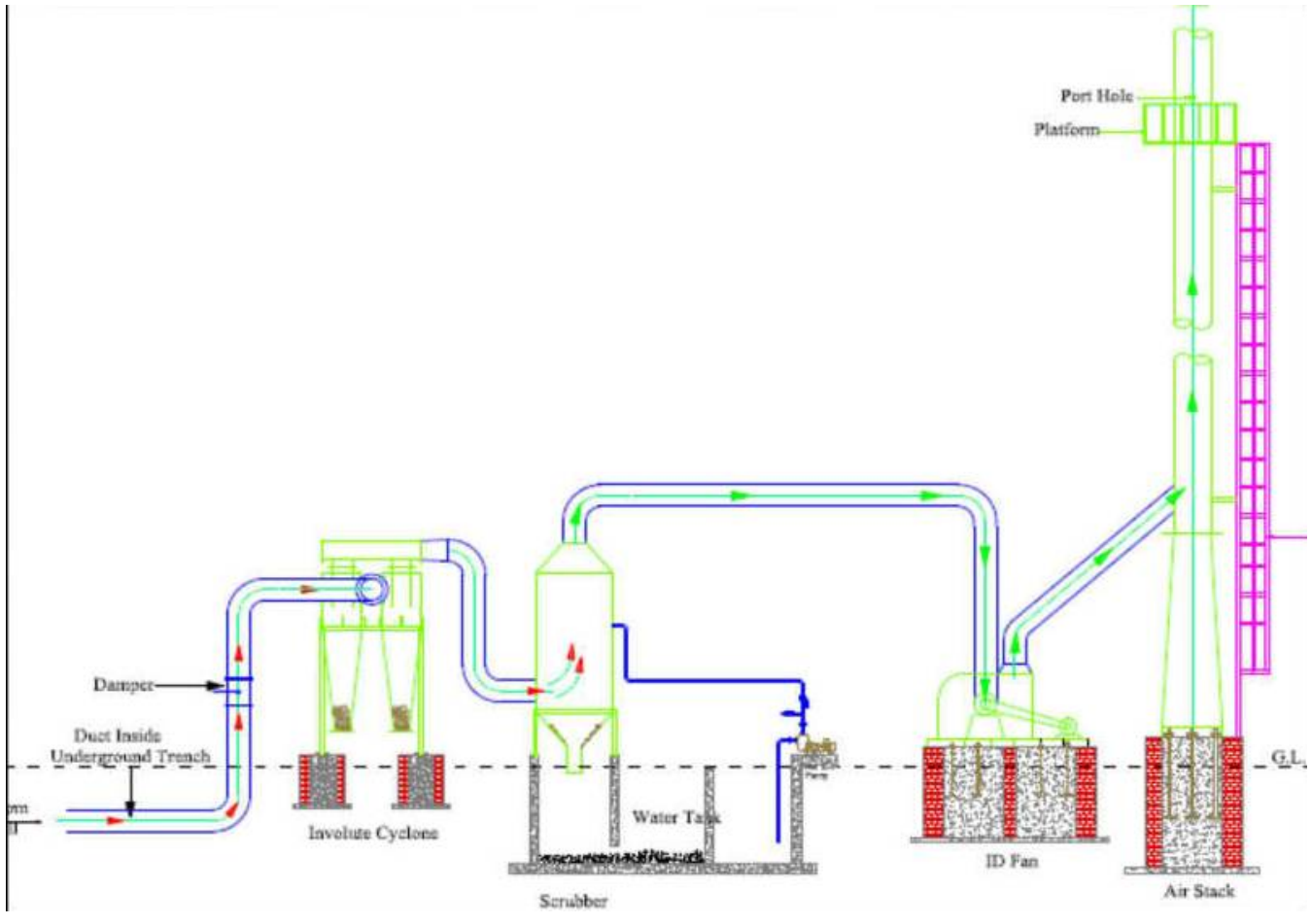
- Scrubber based System for Oil / Gas Fired Furnaces
- Cyclone and Scrubber based System for Coal Fired Furnaces

AIR POLLUTION CONTROL SYSTEM FOR COAL FIRED STEEL RE-ROLLING MILLS



THE WORKING OF APCS FOR STEEL RE-ROLLING MILL (COAL FIRED)

Air Pollution Control System for Steel Re-Rolling Mills (Coal Fired) is a Wet Type System. It consists of a high efficiency Cyclone followed by a Perforated Tray Type Wet Scrubber and a set of ID Fan and Stack.



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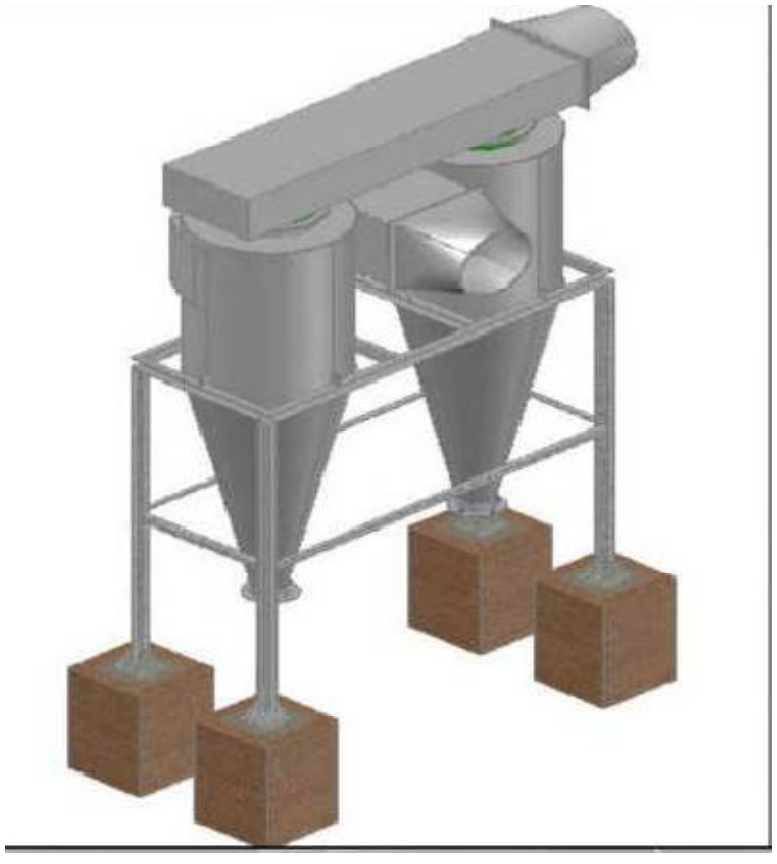
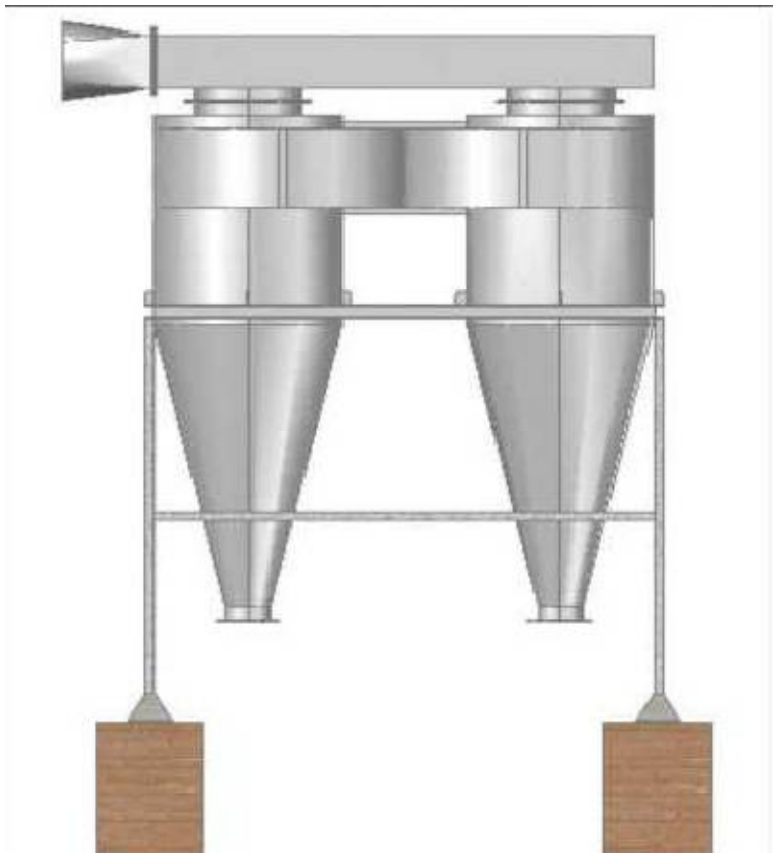
INVOLUTE CYCLONE

It is provided to capture the medium size particles from the furnace. The mechanism of the device is based on centrifugal forces entering in a tangential inlet cyclone. The medium size particles are arrested in the cyclone so that efficiency of scrubber with respect to fine particles increases.





SCRUBBER

Unit has been provided with a Wet Scrubber. It is a perforated plate type single stage scrubber. Gases enter the scrubber from the side of the column and are showered with water spray as they move up through the tray and column, forcing them to shed the fine particles they are carrying. Further, they pass through a mist eliminator to ensure that no moisture is carried over from the scrubber. Water carrying dust particles is settled at the water tank below, which is partitioned in the manner to separate suspended particles while the water is recycled.

- The Scrubber is in Stainless Steel construction to resist corrosion.
- pH balancing details are provided to maintain pH of feed water for longer life of equipment.
- Maintenance manholes are provided for trouble free operations of the Scrubber.
- Efficient Mist Eliminators are provided so that no moisture is carried over.
- Three partitioned tank is suggested for settling of suspended particles in the recycled water.

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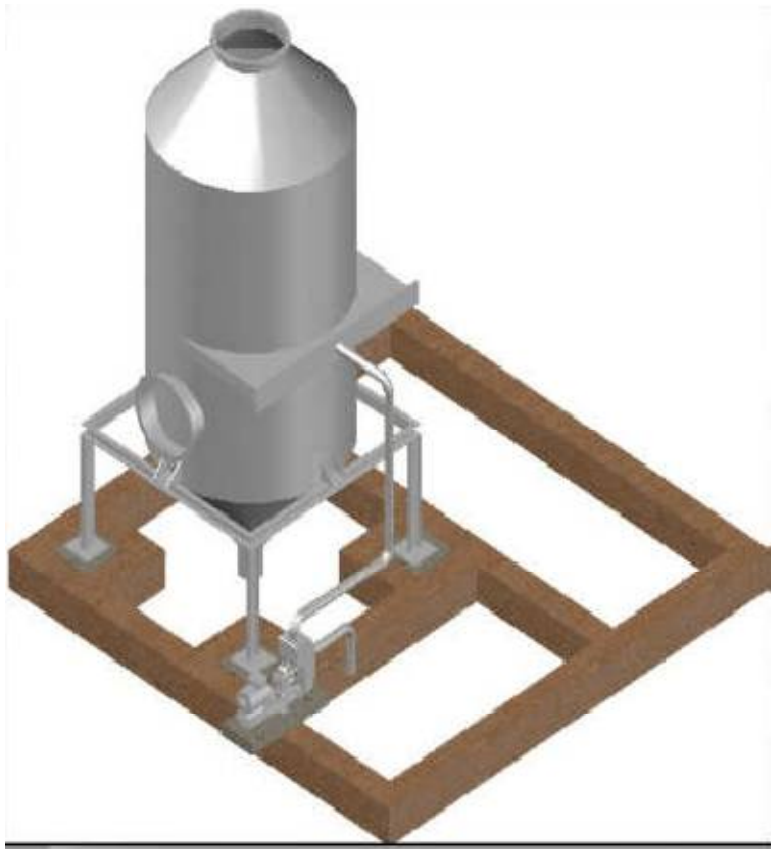
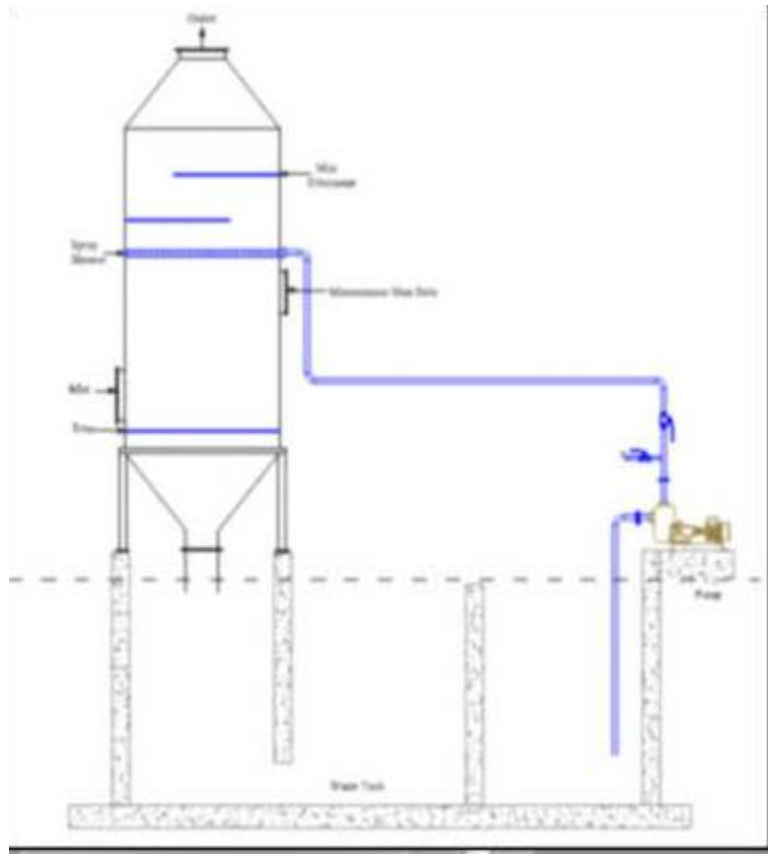
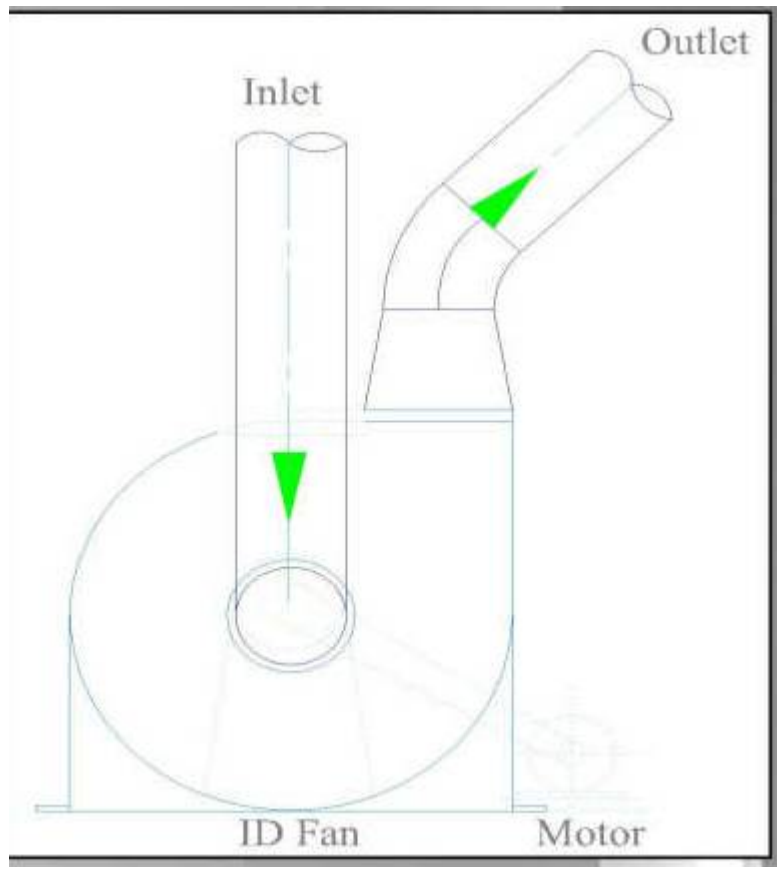




ID FAN

They have been provided for creating an adequate negative pressure in the system for efficient suction of gases.

- The ID FAN is statically and dynamically balanced.
- The ID fan is provided with adequate static pressure for such type of devices.
- The fan volume is adequate to provide required dynamic pressure at suction point.



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AIR STACK

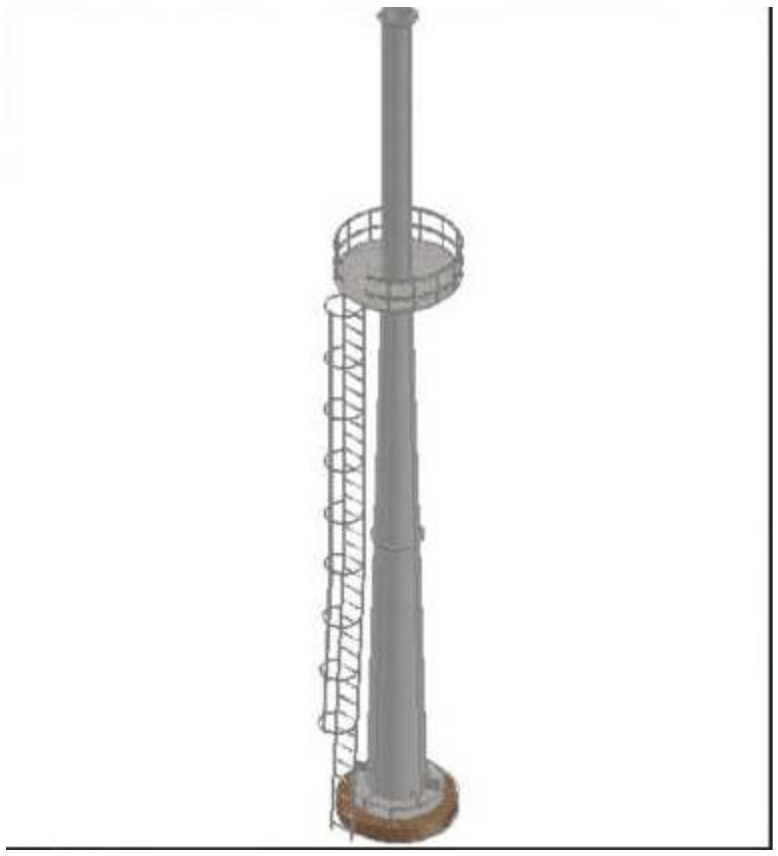
. It is provided to release the treated gases into the atmosphere through an adequate chimney.

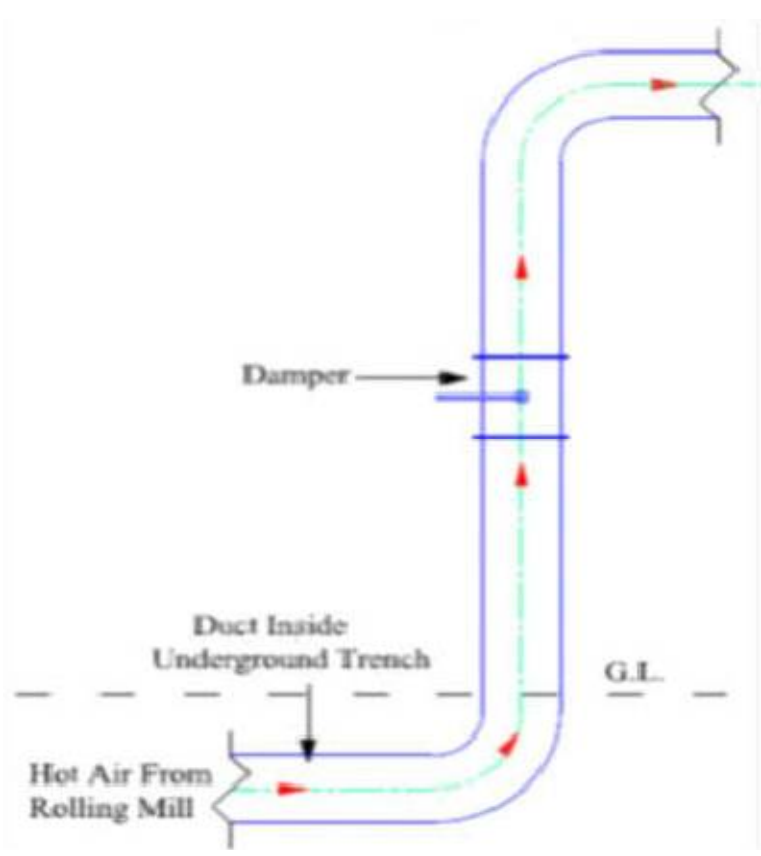
. The air stack is provided with aerodynamic bottom part to enable easy flue gas entry and for structural strength.

DUCTING

Ducting and Bends are provided in the system for conveyance of gases at appropriate velocities and also to reduce the temperature by natural convection. An adequate length and size of ducting is necessary for proper conveyance of the gases at minimum pressure drop. The bends provided should be aerodynamic in shape so that there will be minimum pressure drop and no dust build up during
operation. The main feature are

- All bends and fittings are aerodynamic resulting in min. pressure loss and min. dust accumulation.
- Provided with manual damper for adjusting suction draft of the ID Fan if required.





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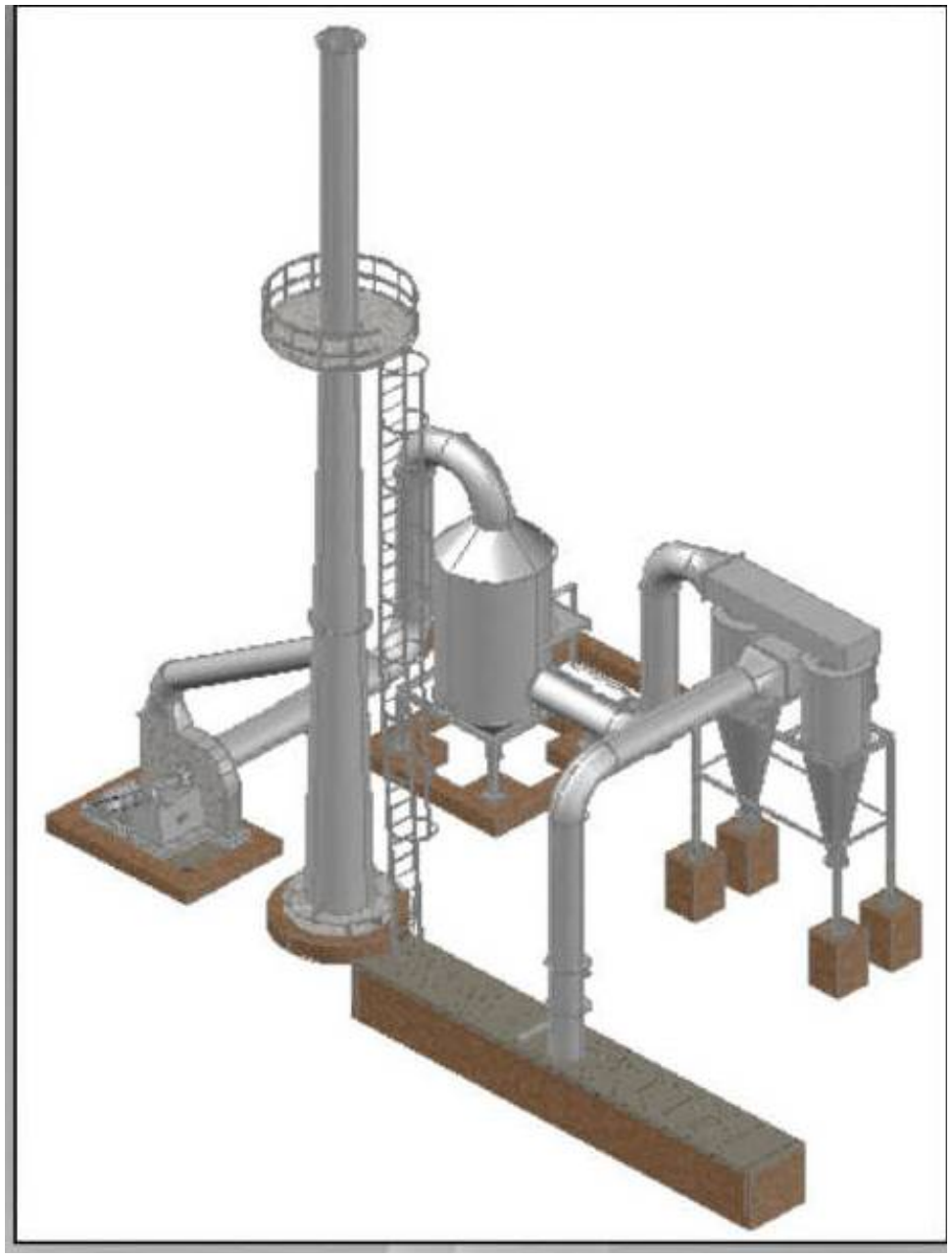
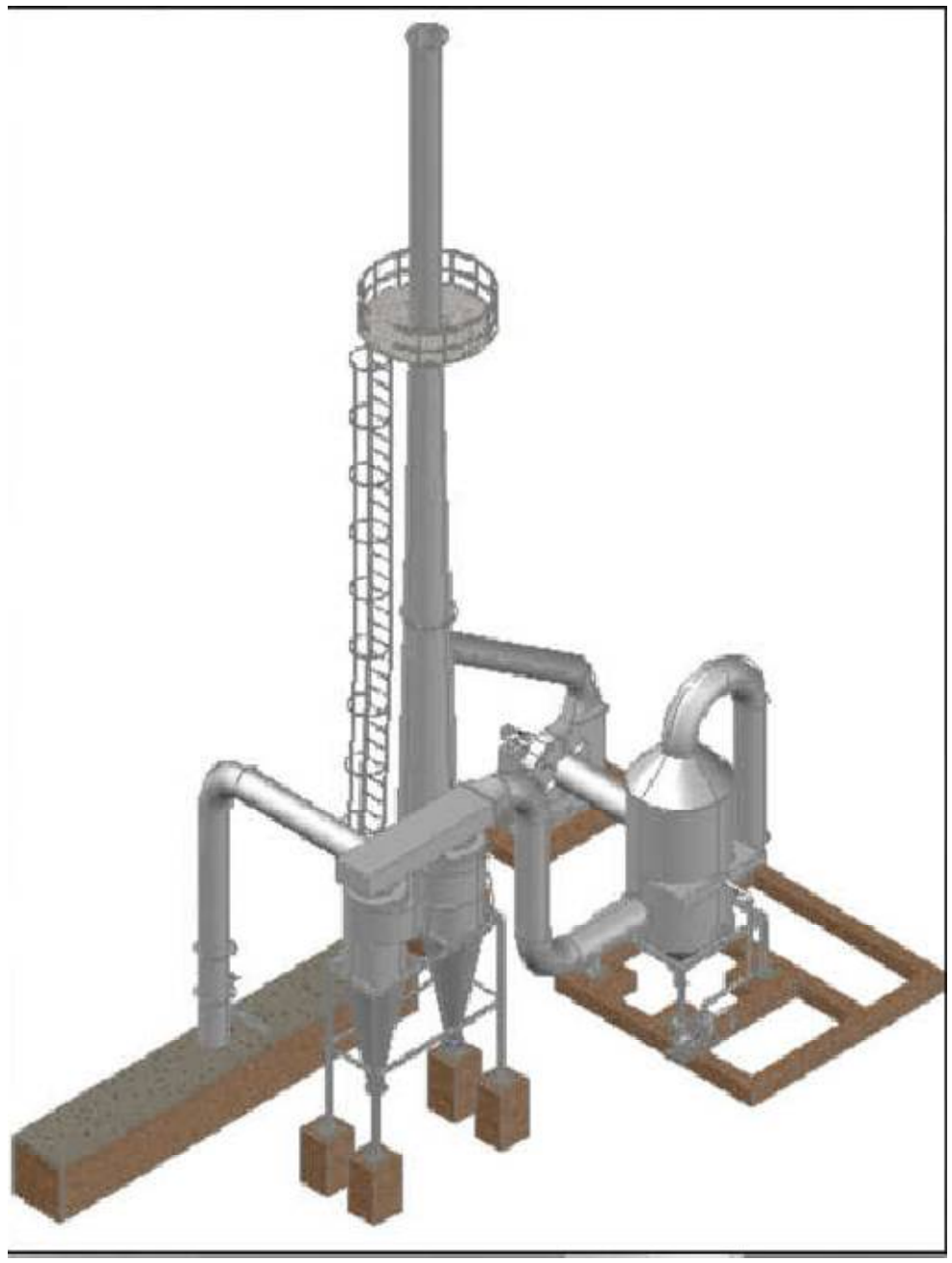
ISOMETRIC VIEW OF AIR POLLUTION CONTROL SYSTEM





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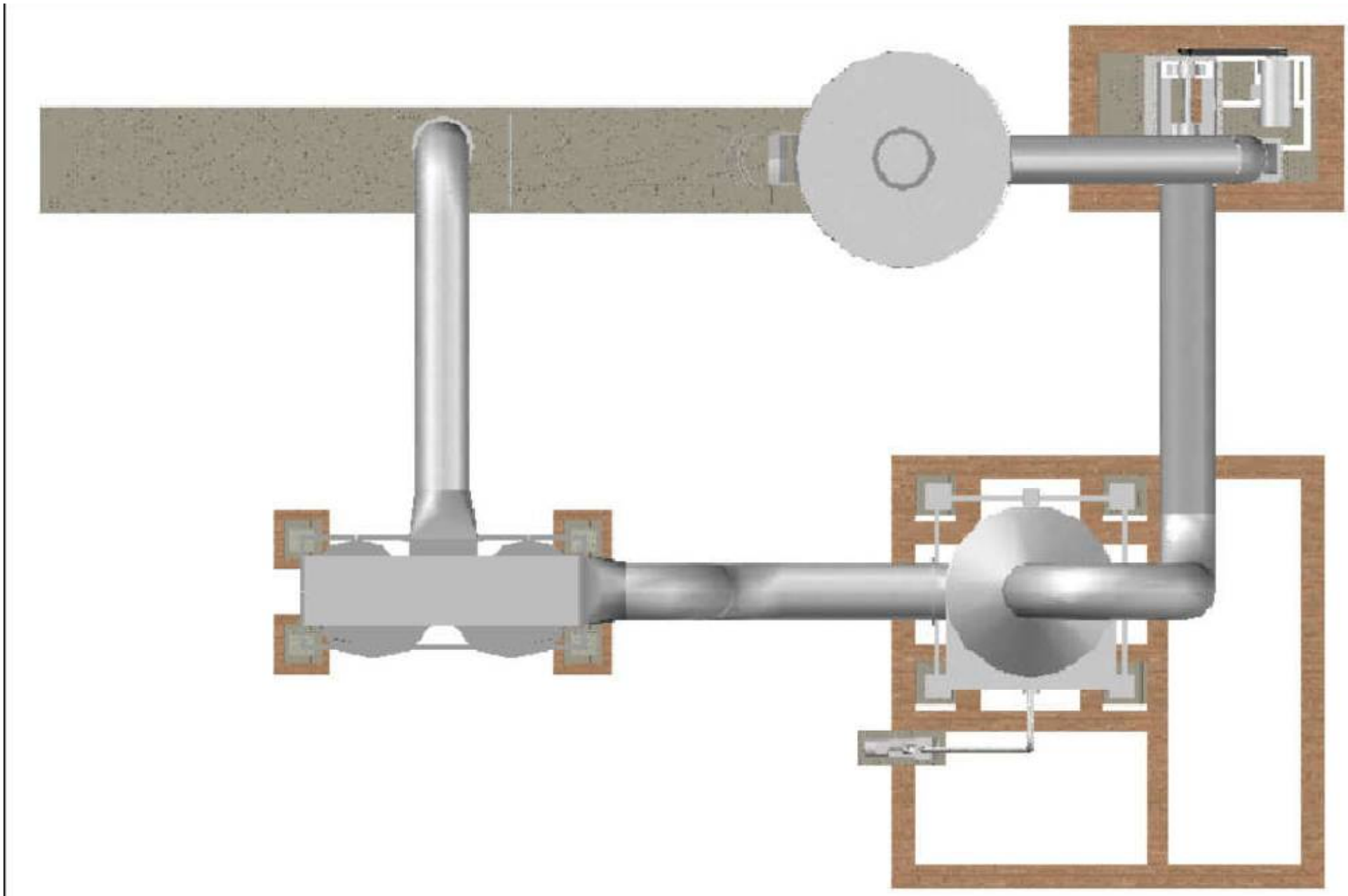
PLAN VIEW OF AIR POLLUTION CONTROL SYSTEM



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