

Air Pollution Control Equipments

(Design, Manufacture & Commissioning)



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Introduction

- In steel melting plants, while melting the steel scraps using an induction furnace; hot flue gases is produced (emission). This gas has to be cooled & purified by adopting scrubbing and filtering methods, before it is let out into the atmosphere.
- The Pollution control equipments will be designed and sized individually based on the furnace used, in order to meet the parameters prescribed by the Pollution control board. The basic methods involve:
 - Cooling the air
 - Wet and dry scrubbing &
 - Bag filtering

Working Principle

- The temperature of the gas at the top of the furnace will be around 700 °C and at the top of the hood will be around 350 °C – 400 °C (The temperature get reduced by mixing with the surrounding cool air). The gas entering the hood is sucked by using a suitable capacity suction blower (say 60,000 m³/hr air blowing capacity). The required motor for the above blower will be 125-150 HP. Since we are using a bag filter in the course of purification of gas, it is necessary to cool the gas to a temperature less than 90 °C – 85 °C in order to protect the cloth bags.

Objective

- To design, fabricate and supply the pollution control equipments to reduce the particulate matters, temperature and other chemical contents of the flue gas within the general parameters specified by the Pollution control board.

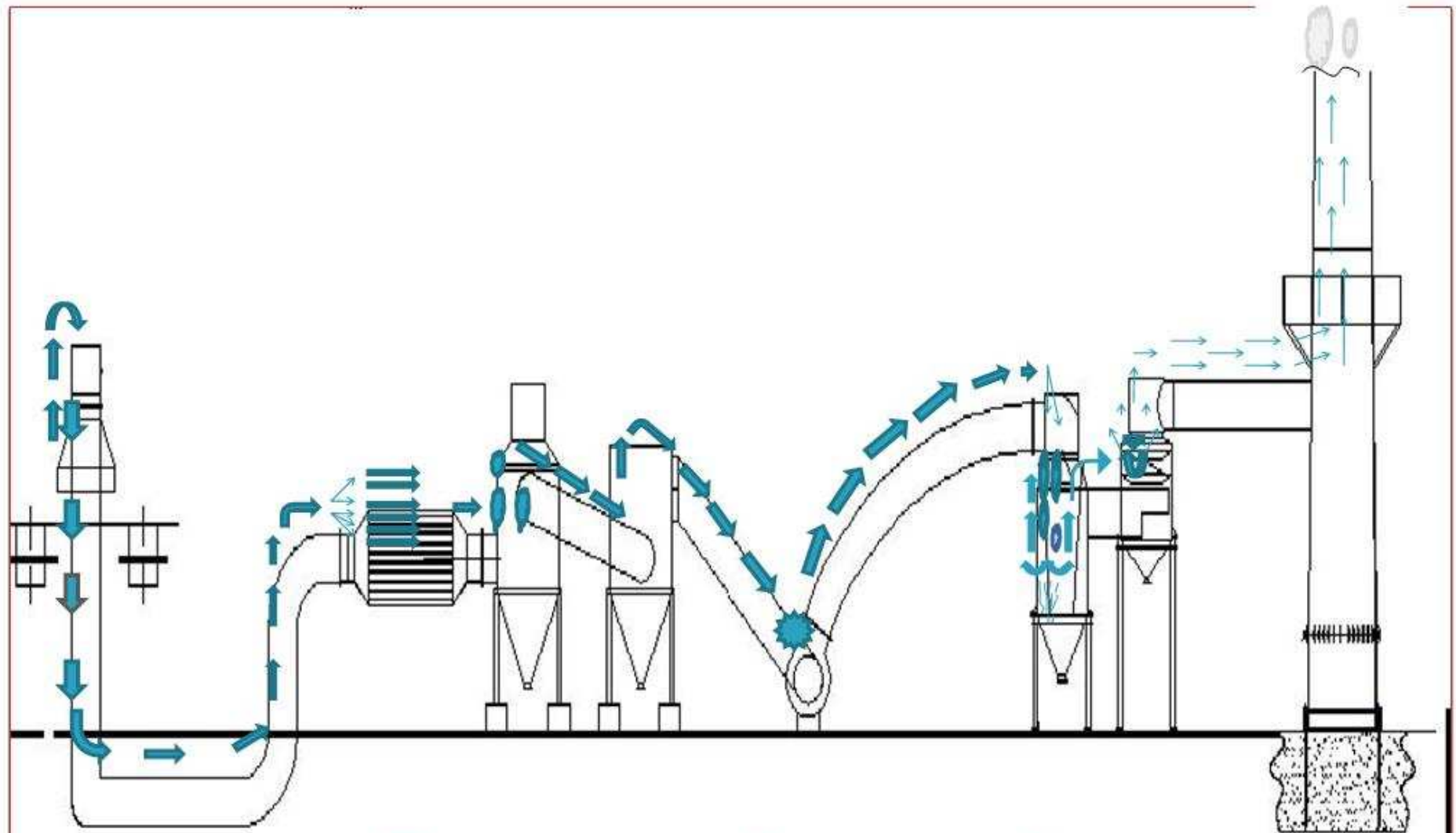
Working Principle

- To cool the gas from 400 °C – 85 °C, we will be using a tubular type gas cooler. The gas cooler consist of 36 Nos. 150 mm dia M.S. Pipes of 4mm thick placed horizontally in a zigzag pattern of almost 3 meter length. Inlet and outlet hood will be provided on both the ends. The pipe will be exposed from 3 sides to the atmosphere and ID fans will be provided at the closed end. The fan is designed as per the required quantity of air at the atmosphere temperature.

- The cooled gas is then drawn through a set of bag filters. The bag filter is one of the best equipment which can purify the gas by filtering maximum particulate matters by using a great deal of bags. In the first stage steel mesh bags of 10 microns will be provided in order to collect the heavy particles and in the second filter fine cloth (fabric) bags are used in order to trace the finest possible particulate matters.
- By filtering through the bag filter the measure of the particulates shall be below $100\text{mg}/\text{mm}^3$, to make sure that the gas going out through stack is fully non-polluted.

- We will be providing a set of scrubbers. In the first one will be water spray type wet venturi scrubber and the other one will be a dry scrubber.
- In the wet scrubber, the gas enters through the top of the scrubber. The cold water is then sprayed from the side of the scrubber body using a spray nozzle. The mixture of gas and water thus formed will be drawn towards using a long venturi. The particulate mixed with the water will be collected at the bottom cone by means of a sealing tank. The water collected will be filtered using a 3 stage sand filtering tank and will be circulated/re-used for the process again. The cold gas will be blown out through the outer ring of the wet scrubber through a dry scrubber.

- The gas coming out of the wet scrubber will have some water particulates, which will be scrubbed and dropped down to the sealing tank by a set of conical baffles in the side/shell of the dry scrubber. The gas from the wet scrubber enters at the bottom of the dry scrubber and gets out at the top of the stacker, after rubbing on the conical baffles arranged in the scrubber. The scrubber will be designed such that the velocity after hitting the baffles will be reduced gradually, so that any particulates or drop of water scrubbed by the baffles falls to the bottom cone of the scrubber body.



Process Layout

Conclusion

- Only cool and clear air around 40 °C – 50 °C will be escaping through the tip of chimney, resulting in reducing environment pollution/air pollution.

Previous & Current Projects

- M/s. Padmabalaji Steels, Kerala
- M/s. Paragon Steels, Kerala
- M/s. Prince Steels, Kerala
- M/s. Suryabalaji Steels, Tamil Nadu
- M/s. Jindal Aluminium, Karanataka
- M/s. VSSC, Kerala