Executive Summary

Of

Proposed Expansion of Steel Plant and Regularization of Partly constructed Iron Ore Pellet Plant

(BROWNFIELD PROJECT)

At

Survey No. 1259/7, 1260/2, 1260/1, 1263, 1257/6, 1258/1, 1259/1,2,3,4,5,6 and other

Joratarai Village, Mangatta (PO)

Rajnandgaon Tehsil & District,

Chhattisgarh

Baseline Monitoring Period: March 2022 to May 2022

PROJECT PROPONENT

M/s. CREST STEEL & POWER PRIVATE LIMITED

Environmental Consultant

Pollution and Ecology Control Services

QCI-NABET Accredited EIA Consultant for Metallurgical Industries (Sector 8)
Accreditation no.: NABET/EIA/SA0165 Valid till 16.10.2022

September 2022

EXECUTIVE SUMMARY

INTRODUCTION

M/s Crest Steel and Power Private Limited (CSPPL) has been promoted by well-established entrepreneur. This operational and partly constructed 1.4 MTPA Iron ore pellet project has been takeover through NCLT by new management.

After take over the new management decided to complete the partly constructed various units of the plant and proposed to expand the capacity of the plant. It is also decided to regularise the partly constructed 1.4 MTPA Iron Ore Pellet Plant by obtaining various clearance and approvals.

The products are in high demand and are being regularly used in the national infrastructure development projects, projects of strategic importance including railways & Defence organization & different establishment. Strict adherence to quality is maintained through sophisticated technology installed in the plants, which is a special feature of the Group.

The Environmental Clearance was granted by Ministry of Forest and Climate Change, New Delhi vide letter no - J- 11011/753/2008-IA II (I) dated 27th August 2010 for the following facilities and production capacities.

Table 1: Production Capacities as per Environmental Clearance

S.N.	Details	Existing	Proposed	Total
1.	Iron Ore Crushing Plant	---	17,95,200 TPA	17,95,200 TPA
2.	DRI (Sponge Iron)	1,15,500 TPA (1X350 TPD)	8,08,500 TPA (7X350 TPD)	9,24,000 TPA
3.	Induction Furnace with LRF (Billets)	33,600 TPA (2X7 MTPH)	5,44,500 TPA (10X15 MTPH)	5,78,100 TPA
4.	Electric Arc Furnace (Billets)	---	3,30,000 TPA (1X40 MT)	3,30,000 TPA

5.	Rolling Mill (TMT Bars)	---	5,61,000 TPA	5,61,000 TPA
6.	Wire Rod Mill	---	2,06,250 TPA	2,06,250 TPA
7.	Captive Power Plant WHRB FBC	16 MW 8 MW 8 MW	90 MW 56 MW 34MW	106 MW 64 MW 42 MW
8.	Ferro Manganese Ferro Silicon Silico Manganese	32,850 TPA 10,500 TPA 23,750 TPA	59,400 TPA 1900 TPA 42,750 TPA	92,250 TPA
9.	Coal Washery	--	3.2 MTPA	3.2 MTPA

Following are the details of the existing plant in operation with valid Consent to operate.

Renewed Consent to Operate no. 7690/TS/CECB/2022 dated 28/01/2022 valid upto 31/01/2025.

Table 2 : Details of the existing plant in operation with valid Consent to Operate

Sr. No.	**Name of Product**	**Production Capacity**
1.	Sponge Iron (2 x 350 TPD DRI Kiln)	2,31,000 Metric Tonnes Per Annum (Two Lakh Thirty One Thousand Metric Tonnes Per Annum)
2.	Waste Heat Recovery Based Captive Power Plant	16 MW (Sixteen Megawatt)
3.	Fluidized Bed Boiler Based Captive Power Plant	08 MW (Eight Megawatt)
4.	Induction Furnace (2 x 15 Tonnes)	96,000 Metric Tonnes Per Annum (Ninety Six Thousand Metric Tonnes Per Annum)

Now the Crest Steel & Power Private Limited has been taken over by New Management through NCLT.

At the time of takeover of the unit some facilities are in operation and some facilities were underway initiated by old management.

Table 3: Existing Project Configuration

Sr.no.	Facility	Configuration with production	Status	Total
1.	DRI (Sponge Iron)	(a) 2 x 350 TPD Rotary Kiln. Production: 700 TPD	In operation with valid Consent to Operate dated 28.01.2022.	1) 2 x 350 TPD :- 700 TPD (in operation) 2,31,000 TPA 2) 2 x 350 TPD :– 700 TPD (underway) 2,31,000 TPA Total : 4 x 350 TPD
		(b) 2 x 350 TPD Rotary Kiln. Production: 700 TPD	More than 60% of total work completed	
2.	SMS (Induction furnace)	(a) 2 x 15 TPH Induction Furnace 240 TPD Billets	In Operation with valid Consent to Operate dated 28.01.2022	1) 2 x 15 TPH – 96,000 TPA.
3.	CPP	a) WHRB – 16 MW b) FBBB – 08 MW	In Operation with valid Consent to Operate dated 28.01.2022	a) WHRB – 16 MW b) FBBB – 43 MW
		c) FBBB - 35 MW	More than 60% of total work completed	
4.	Coal Washery	1 MTPA	95% of work completed.	95% of the work completed of 1 MTPA coal washery.
5.	Iron Ore Pellet Plant	Iron Ore Pellet :- 1.4 MTPA	More than 60% of Total Work Completed.	This unit falls under Violation Category

The new management after take over of Crest Steel & Power Private Limited through NCLT proposed to expand the manufacturing capacity of existing units and installation of Iron Ore Beneficiation Plant, Sinter plant , Coke oven , Blast Furnace Electric Arc Furnace, Rolling Mill for Structure and Wire Rod Mill ,Hot strip mill , oxygen plant, railway siding and Regularization of Partly Constructed (More than 60%) Iron Ore Pellet Plant.

Following Expansion, Installation of new units and Regularization are proposed.

Table: 4 : Proposed Project Configuration

Proposed Project Configuration					
S.N.	**Details**	**Existing in operation with Valid CTO**	**Under Way**	**Proposed**	**Total**
1.	DRI(Sponge Iron)	2,31,000 TPA(2X350 TPD)	2,80,000 TPA(2X350 TPD)	To enhance the production of operational 2x350 TPD Kiln by change in raw material. After this change the production will be 2,80,000TPA.	5,60,000TPA (4X350TPD)
2.	Iron Ore Beneficiation Plant	---	----	1.8MTPA	1.8MTPA
3.	Iron Ore Pellet Plant (for Regularization)	--	1.4MTPA	--	1.4MTPA
4.	Blast Furnace of 650Cum	--	--	7,28,000TPA	7,28,000TPA
5.	Sinter Plant	--	--	6,00,000TPA	6,00,000TPA
6.	Coke Oven Plant (non recovery vertical shaft with WHRB type)	--	---	3,60,000TPA (2x0.18 MTPA)	3,60,000TPA (2x0.18 MTPA)
7.	Steel Melting Shop	96,000 TPA (2X15TPH)	--	96,000 TPA (2x15 TPH)	1,92,000 TPA.
	4a) Induction Furnace				
	4b) Electric Arc Furnace	--	---	2 x 60 T Electric Arc Furnace with LRF,VOD,CCM	9,50,400 TPA
8.	Rolling Mill (TMT Bars/wire rod radial tyre wire)	---	---	4,00,000 TPA	4,00,000 TPA
9.	Hot Strip Mill (HR coil) , ERW pipe /rectangle /square sections	---	---	4,00,000 TPA	4,00,000 TPA

10	Oxygen Plant	---	---	620 TPD	620 TPD
11.	CPP (WHRB)	1 x 16 MW	---	1X16 MW 2 X 15 MW	1 x 16 MW 1 x 16 MW 2X15MW Total 62 MW
12.	CPP (FBB)	1 x 8 MW	1 x 35 MW	1x35 MW	1X8 MW 2x35 MW Total 78 MW
13.	Coal Washery	---	1.0 MTPA. EC is for 3.2 MTPA	---	1.0 MTPA
14.	Railway Sliding	---	---	3.0 MTPA	3.0 MTPA

PROJECT DETAILS

M/s Crest Steel and Power Private Limited (CSPPL) is a brownfield project to expand the manufacturing capacity of existing units and installation of Iron Ore Beneficiation Plant, Blast Furnace, Sinter Plant, Coke Oven Plant, Electric Arc Furnace, LRF, VOD with slab, bloom billet caster, Rolling Mill for TMT/wire rod with further deep drawing into wire for radial tyre/ wire rope etc and Hot Strip Mill for making HR coil further processing into ERW pipe/ square/ rectangle/ sections and Regularization of Partly Constructed (More than 60%) Iron Ore Pellet Plant.

Table 5: Project at a Glance

Sr. No.	**Description**	**Details**
1	Nature of the project	M/s Crest Steel and Power Private Limited
2	Plant Location	At Survey No. 1259/7, 1260/2, 1260/1, 1263,1257/6, 1258/1, 1259/ 1,2,3,4,5,6 and other Village: Joratarai, Post: Mangatta, Tehsil & District: Rajnandgaon (C.G.).
5	Water requirement for the proposed project	The total requirement of water for the operation of plant is 12575 KLD and is being and will be supplied by CSIDC.
6	Power requirement & Source	150 MW Captive Power Plant and State Electricity Board

7	Land for proposed plant	168.01 ha.
8	Total manpower after commissioning of the unit.	2500-3000
9	Environmental Aspects	Air Pollution Control: ESP in Pellet Plant, Sponge Iron Plant, Sinter Plant, Power Plant and fume extraction system along with bag filters in SMS and bag filter in EAF, Blast Furnace, Coke Oven Plant, followed by stack to control source emission.
9	Total Cost of the project	Rs. 2000 Crores (The cost of the project has been revised as per the current cost of the steel.)

PROCESS DESCRIPTION

Iron Ore Beneficiation Plant.

Iron Ore Beneficiation Process &Equipment

The low grade iron ore fines needs to be concentrated for upgradation of Fe content through the process of beneficiation. Such an upgradation is done by elimination of unwanted gangue materials mainly Silica (SiO2) and Alumina (Al2O3) and few other trace elements found in the iron ore.

Primarily, the method of beneficiating iron ore fines includes washing out and eliminating the gangue constituents at every stage of the beneficiation process.

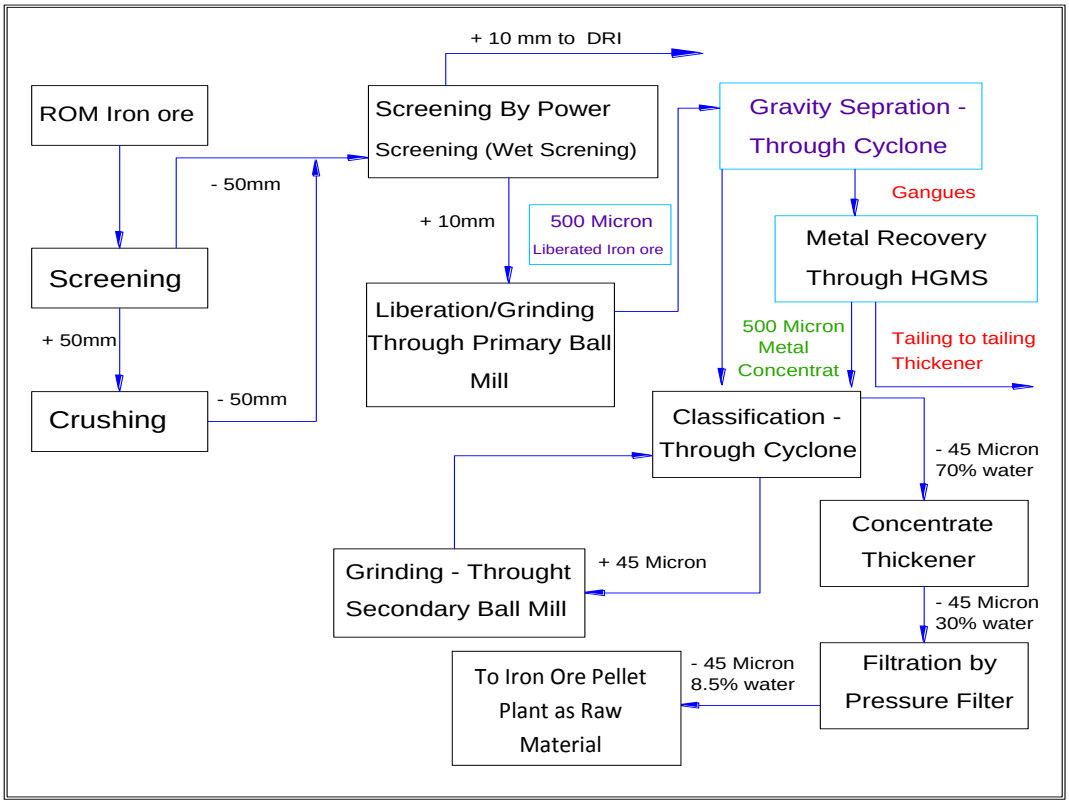


Figure : Flow chart for Iron Ore Beneficiation

Pellet Plant

The previous management has already started the construction to establish iron ores pellet plant in existing plant premises for production of 1.4 MTPA pellet using iron ores fines from beneficiation plant. *The regularization of partly constructed Iron Ore Pellet Plant is mandatory as per order dated 27/05/2014 of Honourable NGT and subsequent orders dated 08/09/2014 and 21/08/2015 issued by Ministry of Environment Forest and Climate Change, New Delhi.*

In this process all raw materials will be proportioned as per requirement of the product quality and intensely mixed to have homogeneity in the quality. The mixed material will be processed in a battery of disc or a drum pelletizer for formation of green balls / pellets. The pellets are controlled for size as well as certain amount of green strength. The pellets are then classified in a roller screen to separate the undersize (-8 mm) and oversize (+18 mm). The rest of the sized pellets are charged onto the pellet Cars. These pellet cars travel through the straight grate Indurating Furnace over an endless chain where the pellets are subjected to controlled rate of heating with updraft, downdraft, and two stages of preheating to a temperature of ~1050 deg. C. The recuperated heat from the process is utilized very effectively resulting in lower fuel consumption.

The process flow diagrams are shown below:-

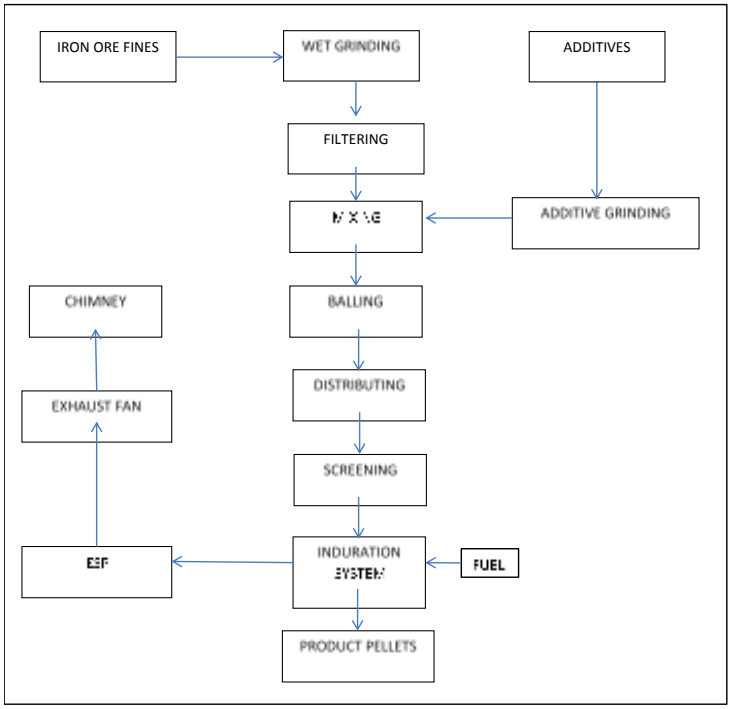
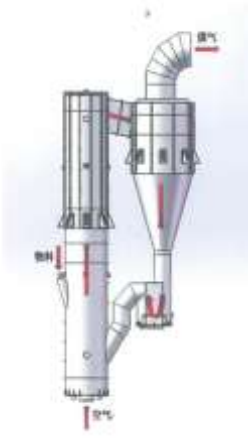


Figure : Flow chart for Iron Ore Pelletization

Fludized bed gasifier

Fluidized bed gasification plant

Coal gasification fluidized bed gasification plant has a pressure vessel containing a hot fluidized sand bed. The coal is pre-dried to a moisture content to reduce the moisture content. A steam-free oxygen-containing gas is fed and distributed, through a grid system at the bottom of the hot sand bed, to hold the bed in a fluidized state and to form, in its lower portion, an oxygen-rich heat-forming combustion zone and, in its upper portion, a hydrogen-rich gas-forming pyrolysis zone. The pre-dried coal is uninterruptedly fed in the pyrolysis zone at essentially the centre of the hot fluidized bed, this centre being determined when the sand bed stands at rest. The fluidized bed is held at an operating temperature of 750° to 860° C. under an operating pressure of 400 kPa to 1750 kPa by controlling the feeding rate of the fluidized gas as well as the feeding rate of the fuel. The gases and fuel residue released from the hot fluidized bed are removed in a gas stream from the head space above the bed and sent to a primarycyclone which separates the useful gases from most of the fuel residue the latter being returned to the combustion zone of the bed.



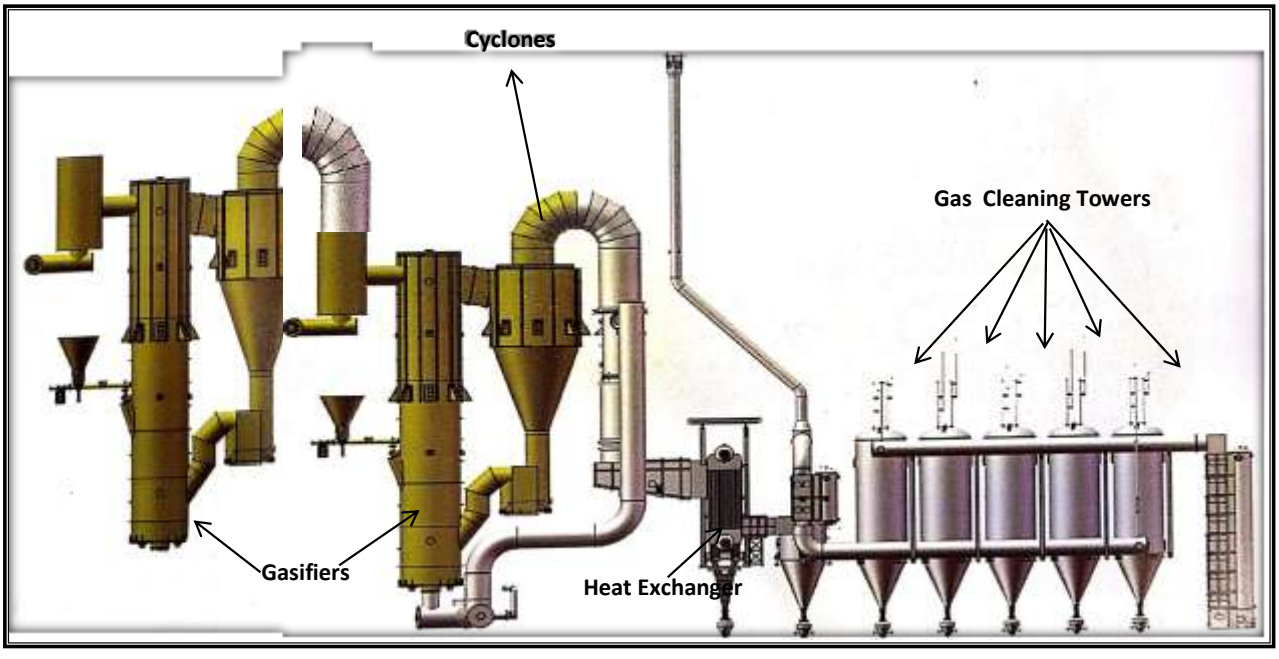
The gases and the residue that have remained in the first cyclone are then moved into a second cyclone where the useful gases are collected and the residue discarded.

Its new technology, it gives a volume from 20000 meter cube per hour to 25000 meter cube per hour,

Major Advantages in compare to other technologies

1. It does not require sized coal, coal particle size is 0 to 8 mm, minus 0 mm should not cross 20%.
2. Less manpower, due to automation and technology stability required manpower to run the plant of same capacity of other types is almost 205 less.
3. Clean Gas and environmental friendly system. Due to technology superiority producer gas is clean and free from phenolic and other impurities. This system is free from all types of environmental issues.
4. Everything is usable: In this system waste management is excellent, Its ash can be used in power plant and only final ash will be disposed off. As gas is clean no ETP is required hence environmental friendly.
5. This system generates steam of 4 to 5 tons per hour out of which 2 tons is self-consumption rest 2 to 3 tons can be used in power plant at de aeration plant, and other places which helps in increasing power plant efficiency and capacity. This cannot be used in direct turbine as low pressure and temperature, but will substitute the low pressure steam requirement.

This producer gas thus produced will be used for pre heating furnace of pellet plant, rolling mills etc for increasing production and process parameters.



Production of Sponge Iron (DRI)

A) Sponge Iron Plant

Production /Manufacturing Process

The process of sponge iron manufacturing involves removal of oxygen from iron ore. Sponge Iron also called as Direct-Reduced Iron (DRI) is produced from direct reduction of iron ore (in the form of lumps, pellets or fines) by a reducing gas using fuel i.e. natural gas or coal. The reducing gas is a mixture majority of Hydrogen (H2) and Carbon Monoxide (CO) which acts as reducing agent. This process of directly reducing the iron ore in solid form by reducing gases is called direct reduction. In this process coal will be used for producing reducer gas and the process will be carried out in a Horizontal Rotary Kiln. The finished product i.e. sponge Iron observed under a microscope, resembles a honeycomb structure, which looks spongy in texture. Hence the name is called sponge iron. The reduction of Iron Ore can be achieved by using either carbon bearing material, such as non-coking coal or a suitable reducing gas in the form of reformed natural gas. The processes employing coal are known as solid-reluctant of coal-based processes while those employing reducing gases are known as gas-based processes.

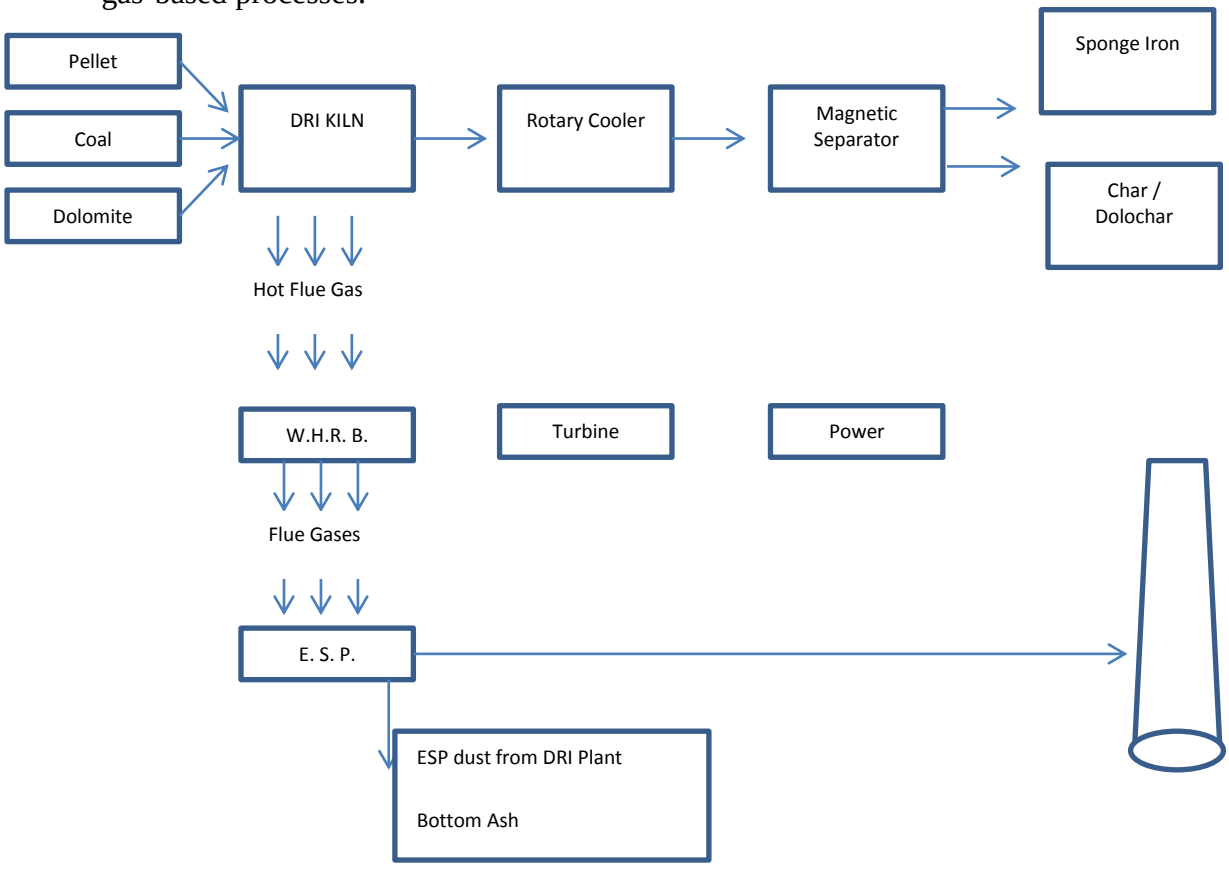
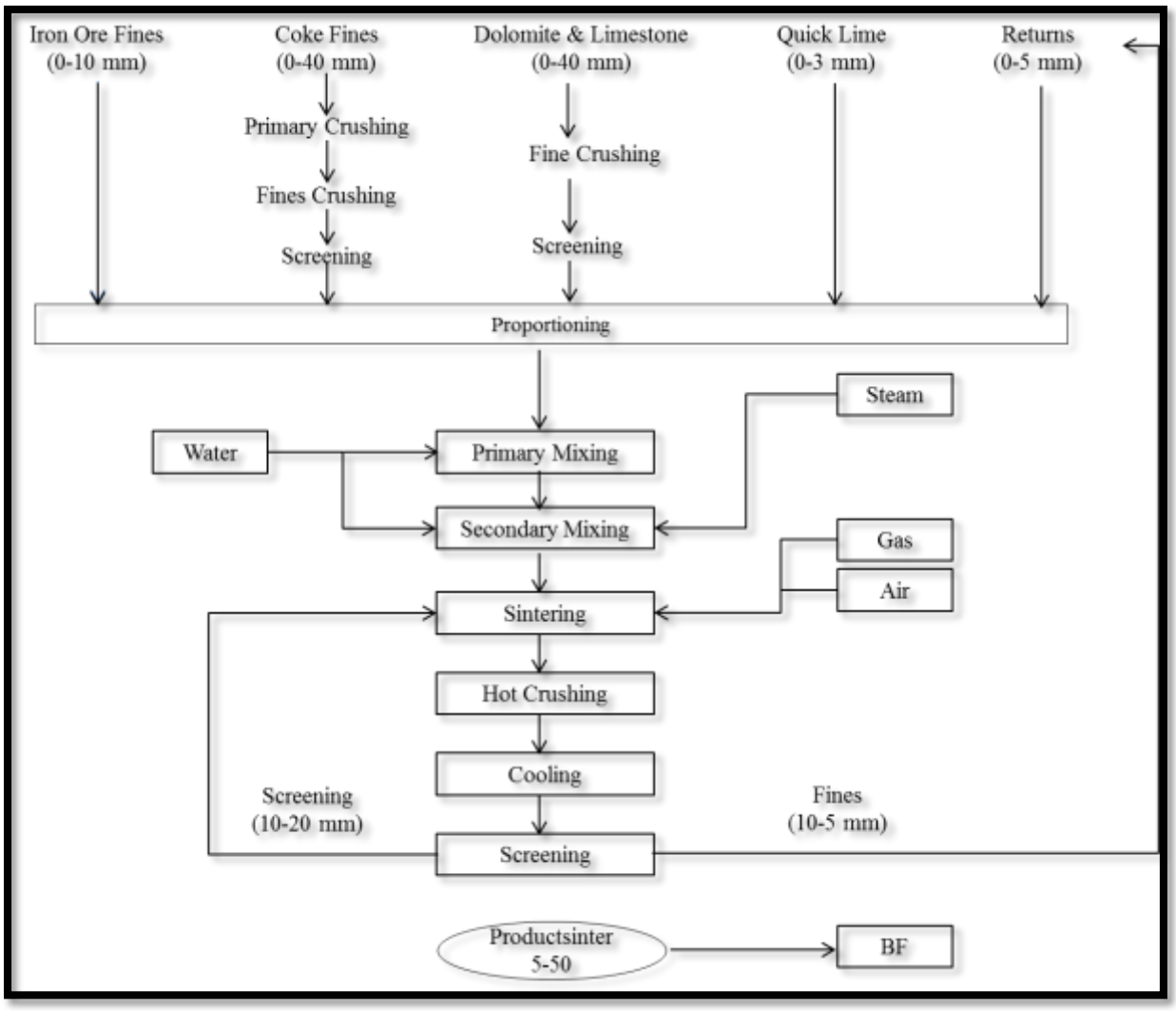


Figure: Sponge Iron Manufacturing Process

Sinter Plant:

The **process**, called **sintering**, causes the constituent materials to fuse to make a single porous mass with little change in the chemical properties **of** the ingredients. Sinter plants agglomerate iron ore fines (dust) with other fine materials at high temperature, to create a product that can be used in a blast furnace.

Block Process Flow Diagram for manufacturing of Sinter

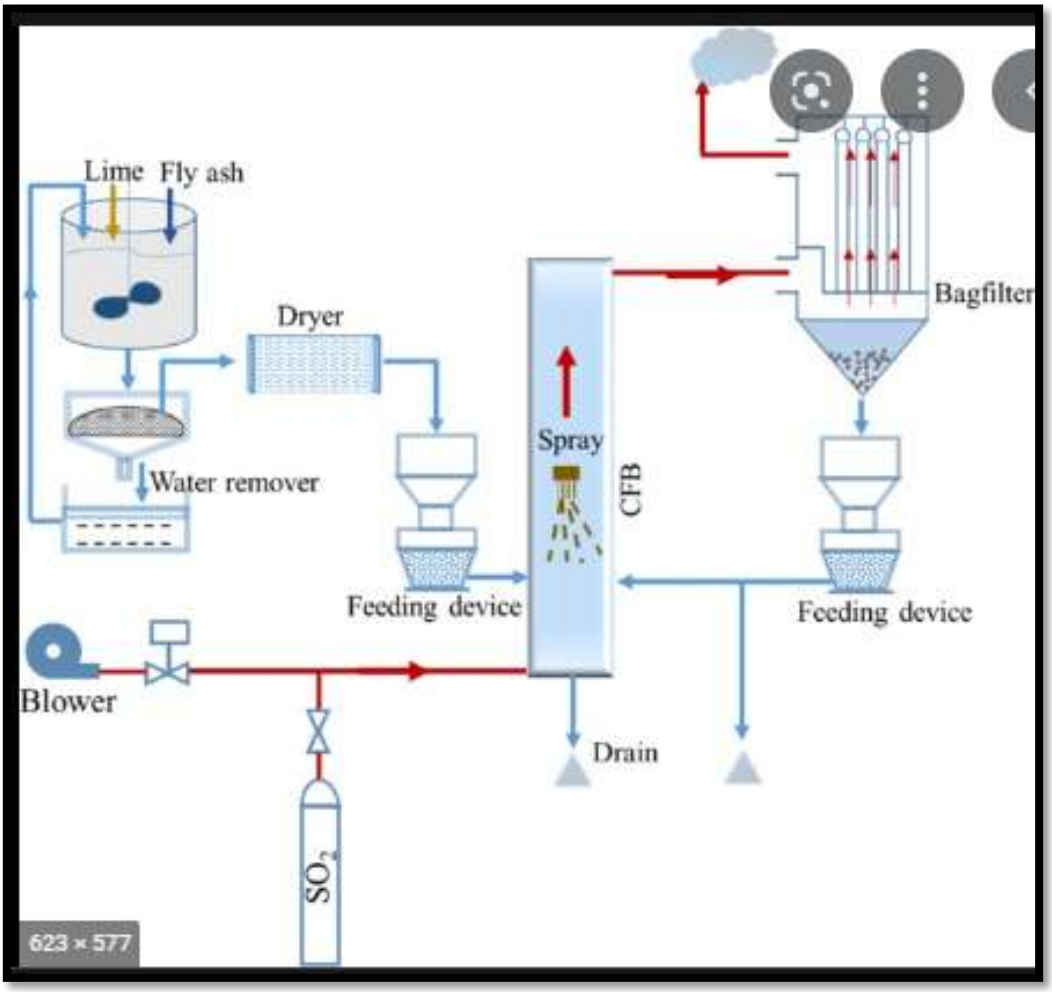


2X0.18 NOS i.e., 0.36 MTPA COKE OVEN PLANT:

Production scale and plant composition

It is proposed to build a 180,000 TPA x 2 nos vertical heat recovery coke oven coking and flue gas waste heat power generation system, using 1x 26-hole 4.3m stamp charging and heat exchange vertical heat recovery coke oven, with supporting construction of waste heat utilization facilities and its auxiliary facilities.

In particular, wet coke quenching is used for coke quenching, the dust removal from the coke is done by means of a ground station, and the machine side fume treatment is done by means of a dust removal ground station.

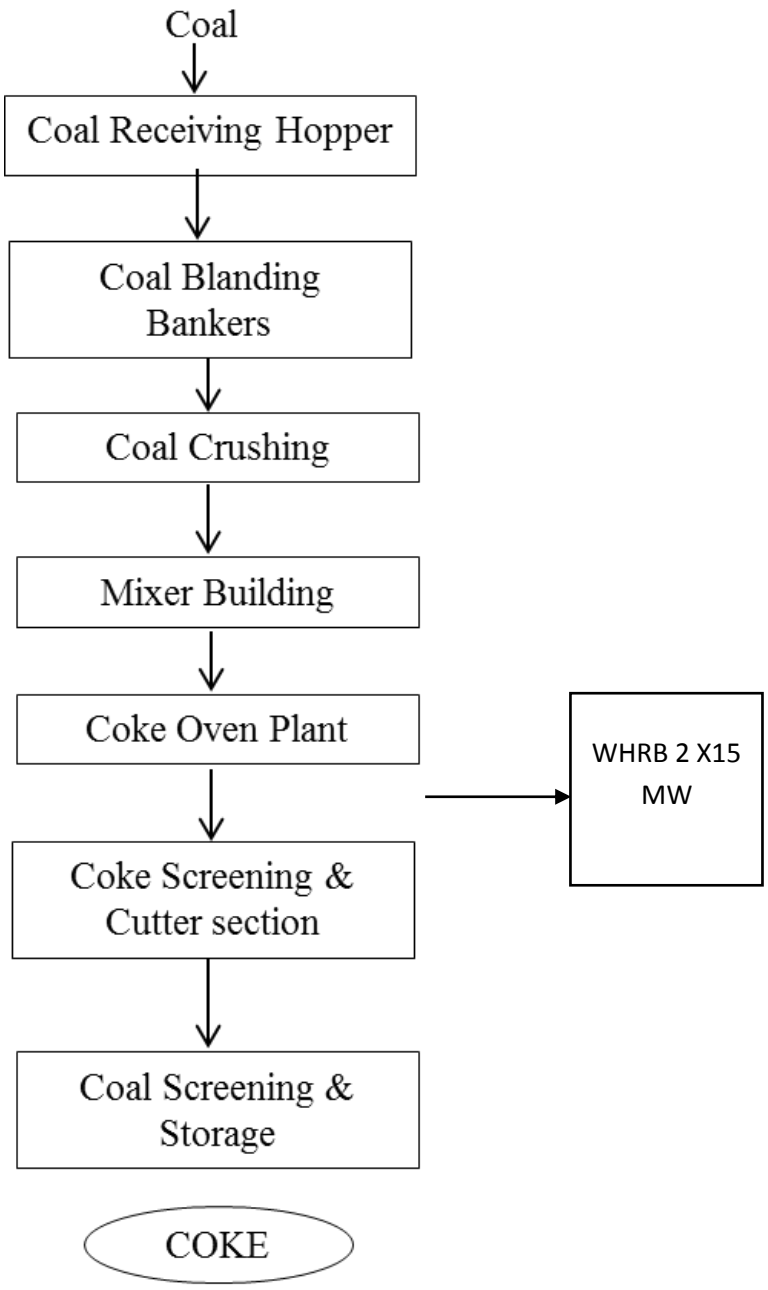


CFB Desulphurisation process flow diagram

Coke oven machine side head smoke and coke discharge de-dusting system

In response to the large amount of soot and coke dust emitted during the loading and discharge of coke from the coke oven, a machine side furnace head smoke de-dusting system and a coke discharge de-dusting system are installed respectively.

Block Process Flow Diagram for manufacturing of Coke

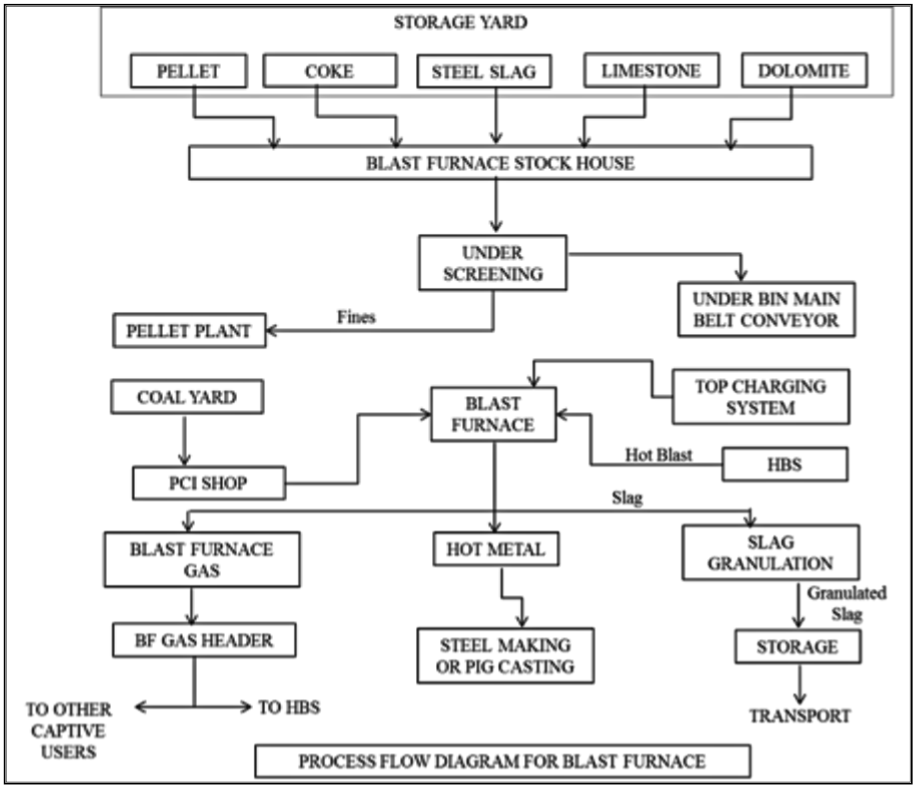


Modified wet quenching shall be provided along with the facilities to treat effluent generated. Space provision is made for addition/alternation modification to allow coke dry quenching facility in future as and when technology becomes viable.

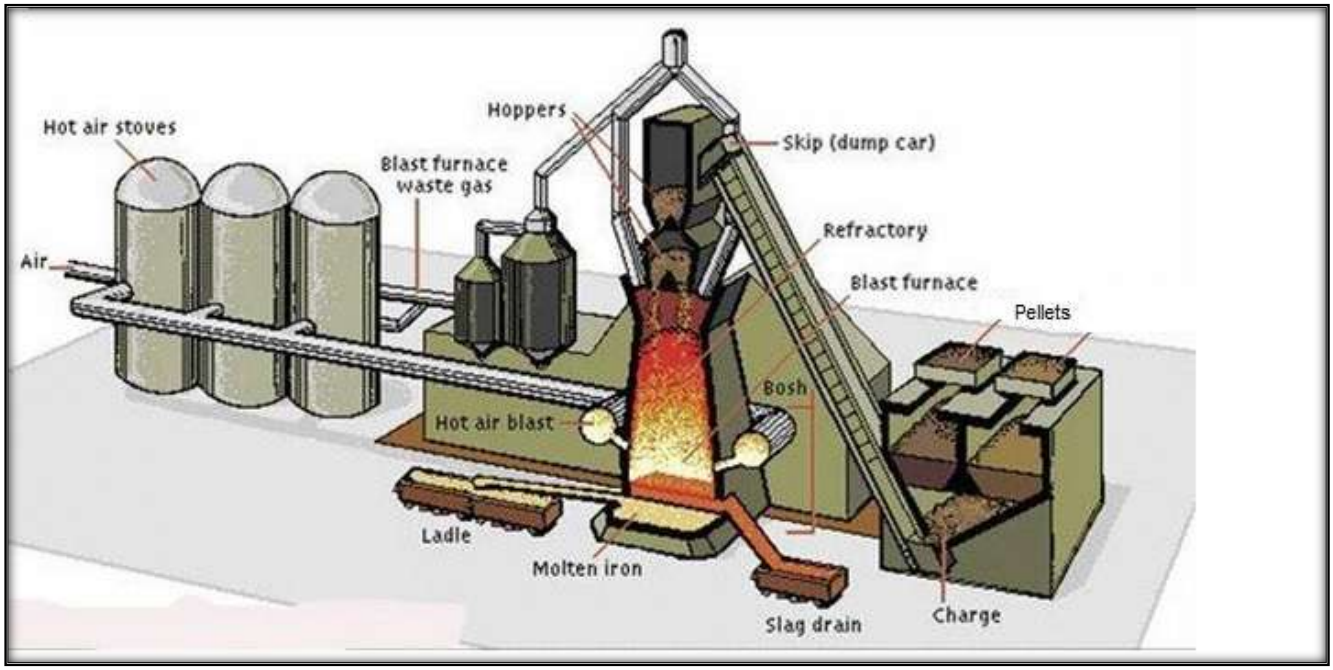
1x650 M^3 Blast Furnace:

Blast Furnace

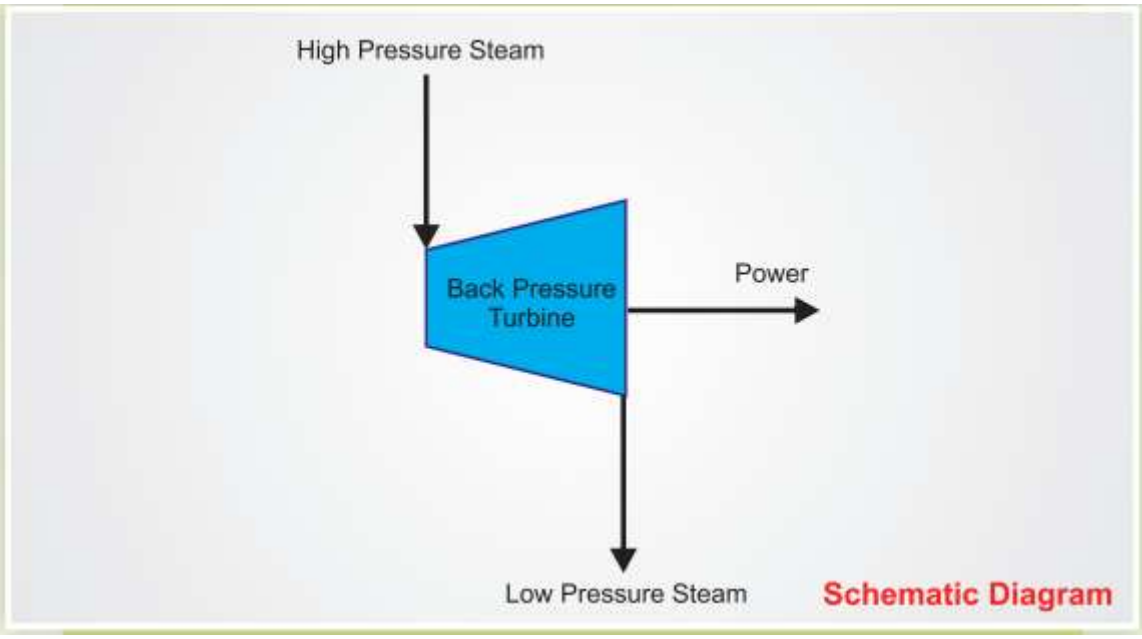
Block Process Flow Diagram for manufacture of Hot Metal



Pictorial Process Flow Diagram for manufacture of Hot Metal



Back Pressure Recovery Turbine (BPRT) is proposed with blast furnace in this method the recovery turbines drive the BF Air Blower directly to provide blast. The Blower is also linked to Electric Motor. The electric power consumption gets reduced by about 30%.



Surplus Blast Furnace gas will be supplied through pipeline from blast furnace to pellet plant and hot strip mill located at the distance of 900 m.

Induction Furnace

Induction furnace works on the principle of Induction melting of scrap and sponge iron with the help of electric power. An alternating electromagnetic field induces eddy current in the metal so that the electrical energy converts into heat whose quantity depends on the resistively of the charge. Induction furnaces are beneficial in steel making for low melting loss. An induction furnace constitutes a single larger primary coil made of water-cooled copper tube. The working voltage is impressed across the terminals of the coil. These furnaces have a great much application for melting of Iron, Steel and Nonferrous.

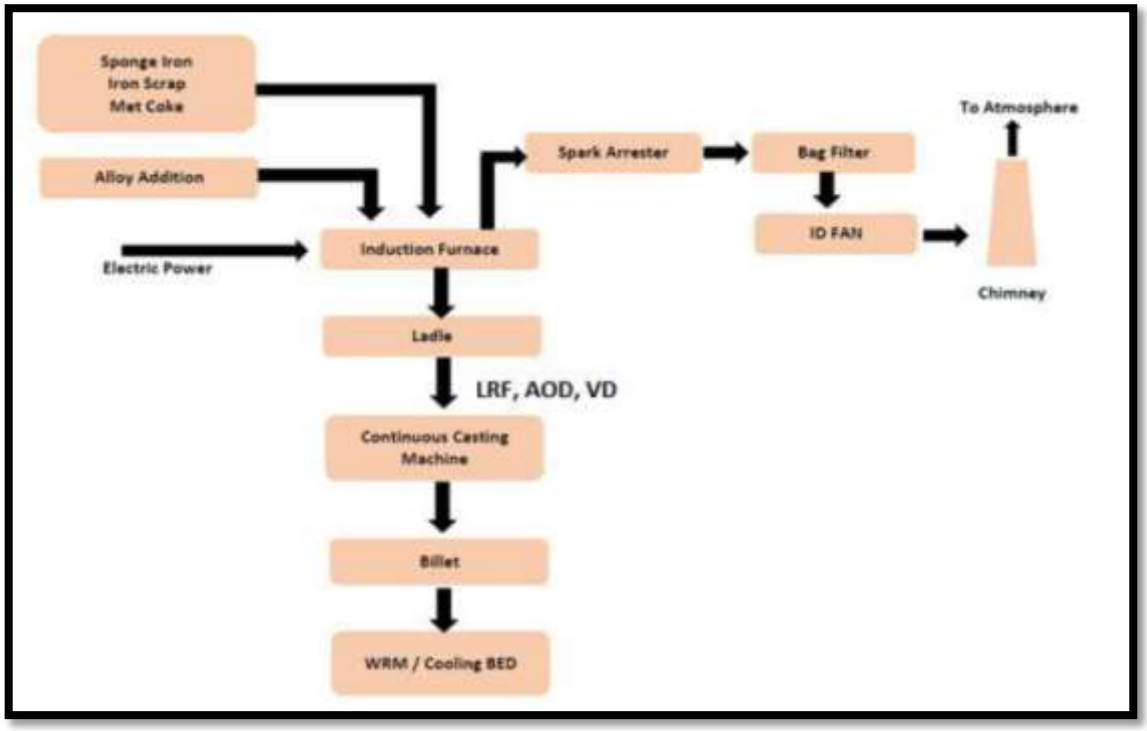
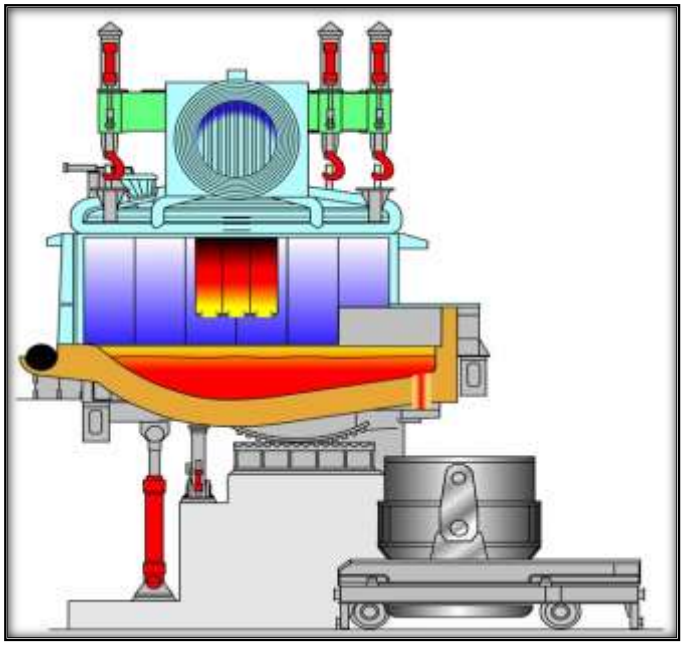


Figure : Induction Furnace Process Flow Chart



Electric Arc Furnace

STEELMAKING AND CONTINUOUS CASTING SHOP

Steelmaking facilities

State-of-the-art steelmaking facilities have been considered for the proposed integrated steel plant. Steelmaking facilities have been considered through EAF-LF route. They have planned to utilise natural resources very well to reduce their production cost. Through EAF-LF route, they will producing 9,50,000 TPA.

Source of metallic charges

DRI, Hot metal from BF and return scrap will comprise the major charge- mix for the EAF operation

Electric arc furnace (EAF)

The electric arc furnace will be of AC arc type with high power transformer (45 MVA each). Major features, which will be incorporated in electric arc furnaces, are as follows.

- Eccentric bottom tapping
- Water cooled side wall panels and roof
- Water spray cooling of the graphite electrodes
- Facilities for calcined lime and calcined dolo charging
- Oxygen blowing facilities
- **Hot metal charging:** Manual charging with the help of EOT crane
- **DRI charging:** Mechanised continuous charging through roof withsystem of overhead bins, conveyors, vibro-feeders, weigh hopper,chute, etc. DRI will be conveyed from coal based DR module of the plant
- **Calcined lime :** Automatic continuous charging through roof.
- **Ferro-alloys and flux addition system :** Mechanised
- **Steelmaking practice:** Single slag, hot heel, foamy slag, slag free tapping. Alloying in ladle during tapping and also at ladle furnace.
- **Steel composition correction :** In ladle furnace
- **Fume collection and cleaning :** ESP type common for electric arc furnace and ladle furnace

Ladle furnace (LF)

Ladle furnace is widely used as secondary refining unit for carrying out heating, deoxidation, desulphurisation, alloying and homogenisation of temperature and chemical composition of steel tapped into ladle fromsteelmaking furnace (i.e., electric arc furnace).

Hot metal will be received from the BF in torpedo ladle cars. The hot metal will be poured in the ladle and then by the help of EOT crane it will be delivered to the hot metal desulphurisation station (HMDS). Facilities for measurement of weight and temperature of hot metal and for taking sample from charging ladle for chemical analysis provided

Hot Metal desulphurisation station (HMDS)

After receipt of hot metal in HM ladle, it is taken into desulphurisation station. It is an enclosed chamber where desulphurisation reagents are injected into hot metal by injection lance. After completion of desulphurisation operation, slag is again removed by slag raking machine in the slag pot.

Continuous casting machine shop

General

State-of-the-art continuous casting facilities have been considered for the present project. For the continuous casting shop cast product will be 950000 t/yr.

To meet the annual casting requirement, one (1) No. of 4-strand billet caster in and one (1) No. of 2-strands bloom caster and slab cater will be installed in the shop along with necessary auxiliary and service facilities.

Billet caster

It is envisaged to install one (1) No. of 2-strand high-speed billet caster with curved mould and a base radius of 9.0 m (approx.). The billet caster will be of latest design with state-of-the art technology and equipped with special features such as parabolic high speed moulds, hydraulic mould oscillator, automatic mould level controller, mould EMS, high intensity multi zone spray cooling system, multi-point unbending, rigid dummy bar, turn- over type cooling bed, billet discharge facilities and computerized process control system (Level-II).

Bloom caster

It is proposed to install one number of 4-strand bloom caster with curved mould and a base radius of 12.0 meter (approx.).

The bloom caster will be of latest design with state-of-the-art technology and equipped with modern features such as mould, hydraulic mould oscillator, automatic mould level controller, mould EMS, high intensity multi zone spray cooling system, continuous straightening, rigid dummy bar, automatic torch cutting machine, walking beam type cooling bed for blooms and computerized process control system (Level-II).

Process flow in continuous casting shop Material flow

The steel ladle containing the liquid steel will be transported from the EAF shop to the secondary refining bay of the continuous casting shop by means of a self-propelled ladle transfer car. After treatment in the ladle furnace, the steel ladle will be lifted by the ladle handling EOT crane and placed on the ladle turret of continuous casting machine. As per the production planning, heat will be transferred to casters as required. In the mean time a tundish lined with refractory materials, preheated to about 11000C and mounted on the tundish car will be moved from the reserve position to the casting position. The ladle slide gate will be opened to allow flow of liquid steel into the tundish. The ladle turret will be rotated through 180o to bring the steel ladle to the casting position.

Prior to start of the casting operation, the dummy bar will be introduced into the mould from below for temporarily plugging the mould and subsequently for drawing the strand. The gap between the dummy bar head and the mould walls will be sealed with asbestos chord and small pieces of steel scrap placed over the dummy bar head for chilling of initial metal.

Water supply to mould, secondary cooling zone and machine cooling will be switched on at this stage. Once steel ladle is positioned above the tundish, refractory shrouding tube will be fixed to the ladle slide gate valve to prevent atmospheric oxidation of metal stream between the ladle and tundish. The ladle slide gate valve is operated to allow the flow of liquid steel from the ladle into the tundish.

As soon as the liquid steel level in the tundish reaches a pre-determined level, the tundish nozzle is opened and liquid steel starts flowing from tundish into mould. When the metal level in the mould reaches about 100 mm to 150 mm from its top, the drives of the mould oscillating mechanism as well as the withdrawal and

straightening unit will be switched on. The withdrawal of dummy bar will begin at the minimum speed, which will be gradually increased to the normal casting speed within a few minutes. Mould lubrication is done by lubricating oil in case of open casting. In case of submerged casting, mould lubrication is done with addition of casting powder into the mould.

During casting operation, the metal level in the mould will be maintained within pre-determined limits. For this purpose, an automatic mould level controller will be provided for each mould. The liquid metal level in the tundish will also be kept within permissible range by automatic adjustment of ladle slide gate valve.

Installation of electromagnetic stirrer (EMS) in the mould has been envisaged for billet to reduce the centreline segregation and improve the surface quality of billets.

The partially solidified strand after leaving the mould will pass through strand guide roller segments where intensive but controlled cooling of the strand will be effected by means of direct spray of water from spray nozzles. Intensity of cooling water flow is linked to the casting speed. The withdrawal and straightening units will be used for introduction of dummy bar into the mould before the start of casting and withdrawing the dummy bar along with strand afterwards. The dummy bar guides the strand below the mould up to the withdrawal and straightening unit and gets disconnected automatically. The strand is straightened in the withdrawal and straightening unit and passes over to the torch cutting roller table.

The dummy bar will be separated from the strand in the withdrawal and straightening machine and moved in dummy bar receiving device, which will be lifted alongwith dummy bar and positioned in parking position. The torch-cutting unit holds the strand, travels with it and cuts it into desired length. Cut strands then travel to the discharge roller table provided for the caster.

The cut cast product will travel on the run out roller tables and transported to cross-transfer section. The cast product are lifted up and then shifted by overhead cross-transfer to turnover cooling bed area/walking beam cooling bed. The cooling bed will receive the cast product and transport them. The marking units will be provided at the entry to cooling bed for marking the product

The cast product will be lifted by handling crane for storage in the storage bay. Facilities of storage grid with pusher to be provided for storing of products.

In case of hot charging to mill, product will be transferred to hot charging roller table

for discharge to mill.

For chemical analysis of liquid steel, samples will be taken from the tundish and sent to the laboratory. The samples will also be cut from cast products and sent to the laboratory for macro etching, sulphur prints and to determine other quality parameters.

At the end of casting, the tundish along with tundish car will be shifted to the reserve position for drainage of remaining slag and metal. The empty tundish will be lifted by the crane and transferred to the tundish preparation area where facilities will be provided for tundish preparation.

Rolling Mill

It is proposed to install a Wire rod mill of 4,00,000 tons/ annum capacity and other Hot strip Mill 4,00,000 tons/ annum within the existing plant premises. The process of rolling involves several steps: -

a. Selection of raw materials – blooms / Billets
b. Shearing and preparing.
c. Heating in Furnace Oil – fired furnace.
d. Rolling.
e. Thermal Treatment (if required)
f. Inspection.
g. straightening and sheering (coil processing)
h. Dispatch.

360 MM Intermediate mill-1complex

The 360 mm Intermediate mill complex comprises of two high stands with roller bearings. These two stands work in tandem with common drive. After rolling through the intermediate mill, the bar makes a 180 degree turn with a repeater with looping pit to the finishing train. (Vide Layout drawing).

310 mm Finishing mill complex for rods

The 300 mm finishing mill complex comprises of two 300 mm two high stands on roller bearings with looping arrangement between stands. The mill train is driven by one 400 KW DC motor for better speed control with the finishing continuous mill. This mill finishes rolls sections like 32, 25 mm, 20 and 16 mm. these sections go to

the TMT section No. 1 (For higher sections) and then to the cooling bed.

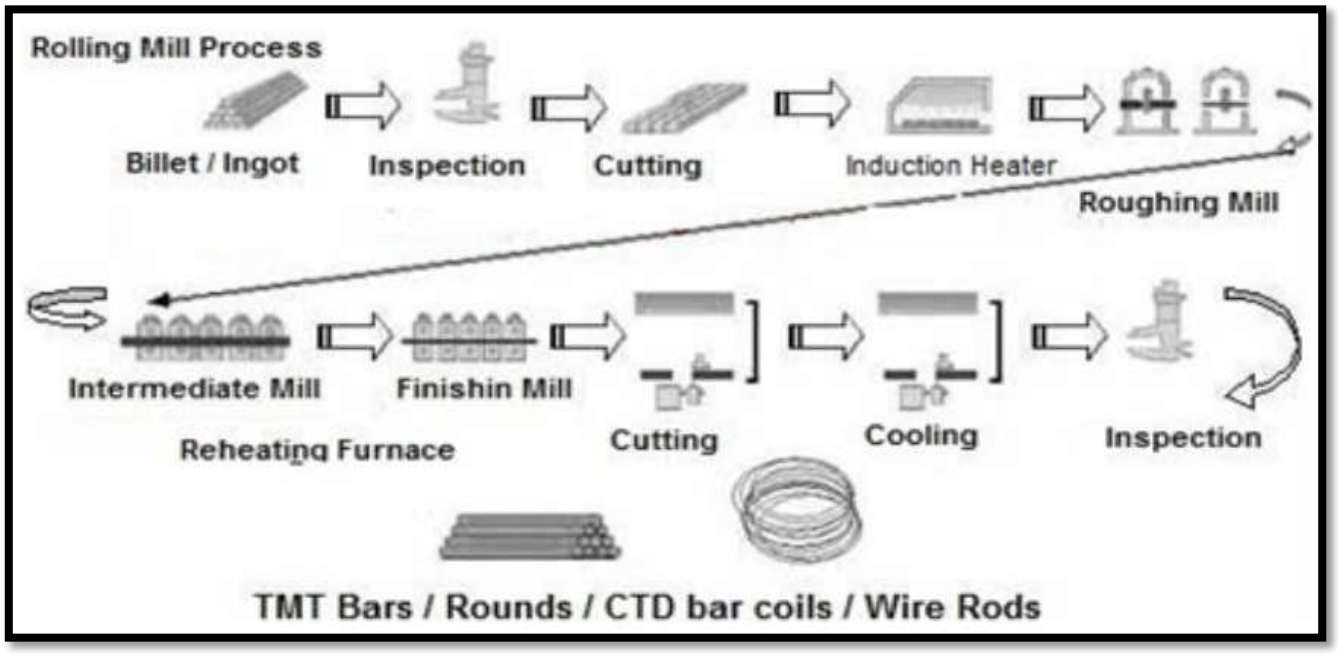
280 mm Continuous mill complex

This complex comprises of six two high stands in tandem powered by separate six Nos. 250 KW DC motor with thyristor drive control mechanism. All stands are having roller bearings. Each stand has individual motor, reduction cum pinion gearbox, guiding devices etc. This group finishes 12 mm after stand no. 2; 10 mm after stand No. 4 and 8 mm after stand no. 6. All these sections reach TMT line No. 2 with separate guiding channels before going to the cooling bed.

The TMT section

The TMT (Thermo-mechanical treatment) section comprises of a water box where the bar rolled from the finishing pass is water quenched in a pipe with arrangement of injecting water at high pressure. A flying shear cuts the front end of the bar before entering the TMT section and pinch rollers push the bar through the water quenching once the tail end of the bar leaves the finishing stand. With water quenching, the surface of the bar gets a tempered martensitic structure while the core remains pearlitic thus attributing to the strength combined with ductility of the bar.

During the process of heating the fuel oil is completely burnt with preheated combustion air and the product of combustion is let in to atmosphere through chimney of adequate height calculated as per Sulphur content in the Furnace Oil in accordance



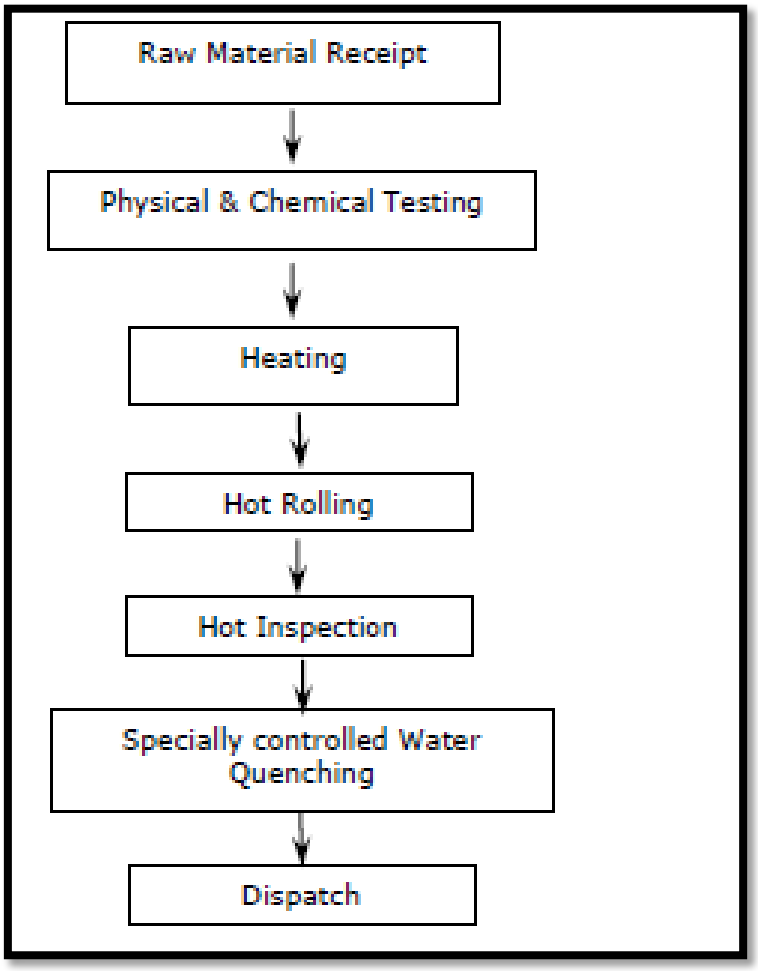
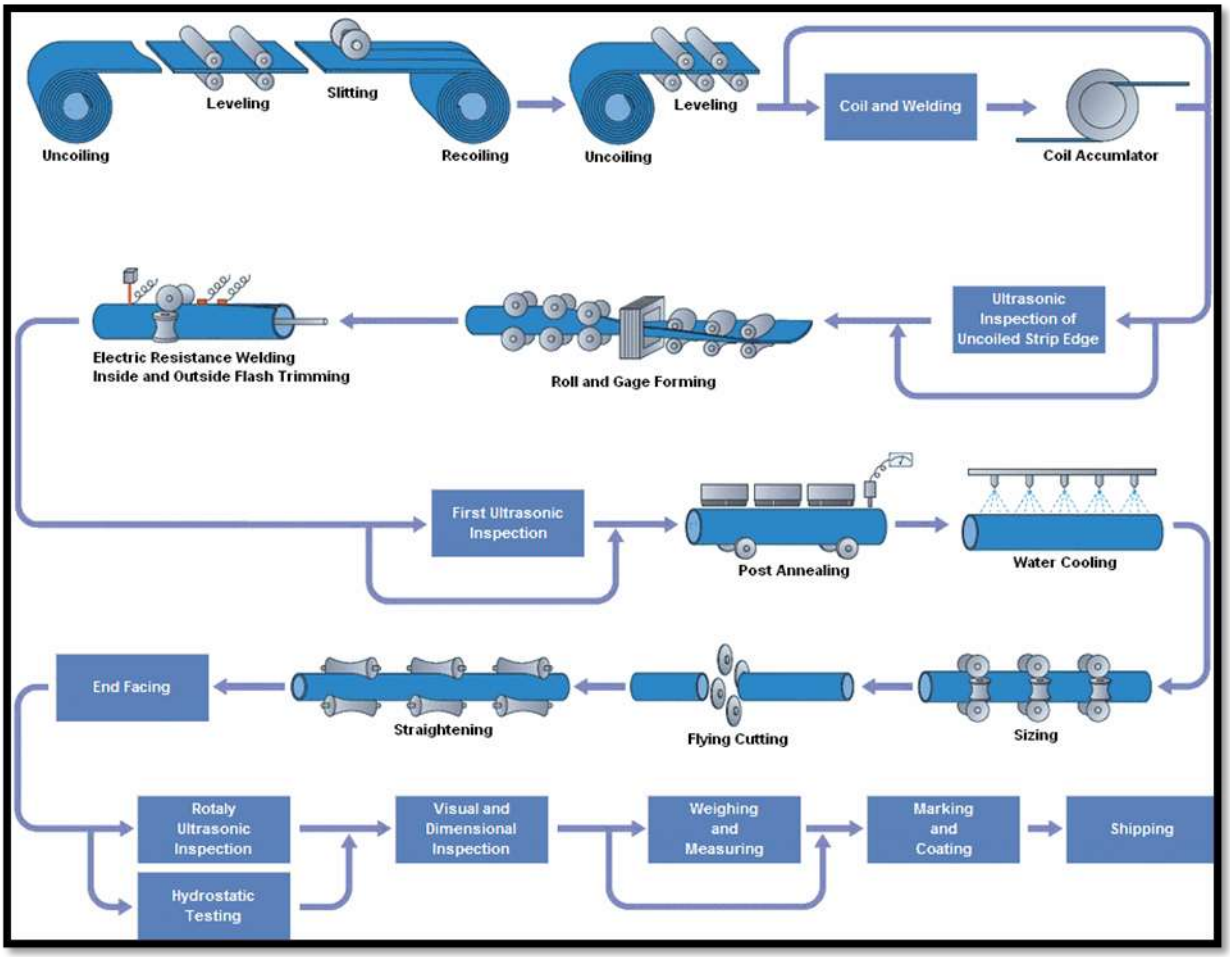


Figure : Flow Chart of Rolling Mill

Hot Strip Mill and ERW Pipe Mill

A continuous casting slab caster would be installed for the purpose of casting slabs suitable for the production of strips and hot rolled coils. The cast slabs shall be sent to the hot strip mill for further processing.



Captive Power Plant

Waste heat recovery system to generate Power

In Sponge Iron manufacturing, flue gases are generated with a temperature of 900-1000 ^{0}C during the process. This heat is cooled without utilizing heat by supplying the air by using FD fans. The heat content in the flue gas is enough to generate the power by installing the waste heat recovery system i.e. boiler. The high temperature flue gases are pass through the boiler for generate the steam and that can be used in turbine to generate the power.

Process Details

The waste gases generated from the Rotary kiln is passed through the boiler to generate the steam. The generated steam is used for generation of power. The temperature available in flue gasses is enough to generate the required steam for power generation through boilers. The boiler is a bi-drum, water tube boiler. The super heater in boiler is designed for an outlet temperature of 490 deg C. The gases leaving the kiln

would enter a super heater. The gases leaving the super heater would enter a set of boiler bank tubes are expanded into the steam and water drums. The gases after passing across the boiler bank would enter a bare tube economizer. This is an inline counter flow economizer and heats up the feed water going to the drum.

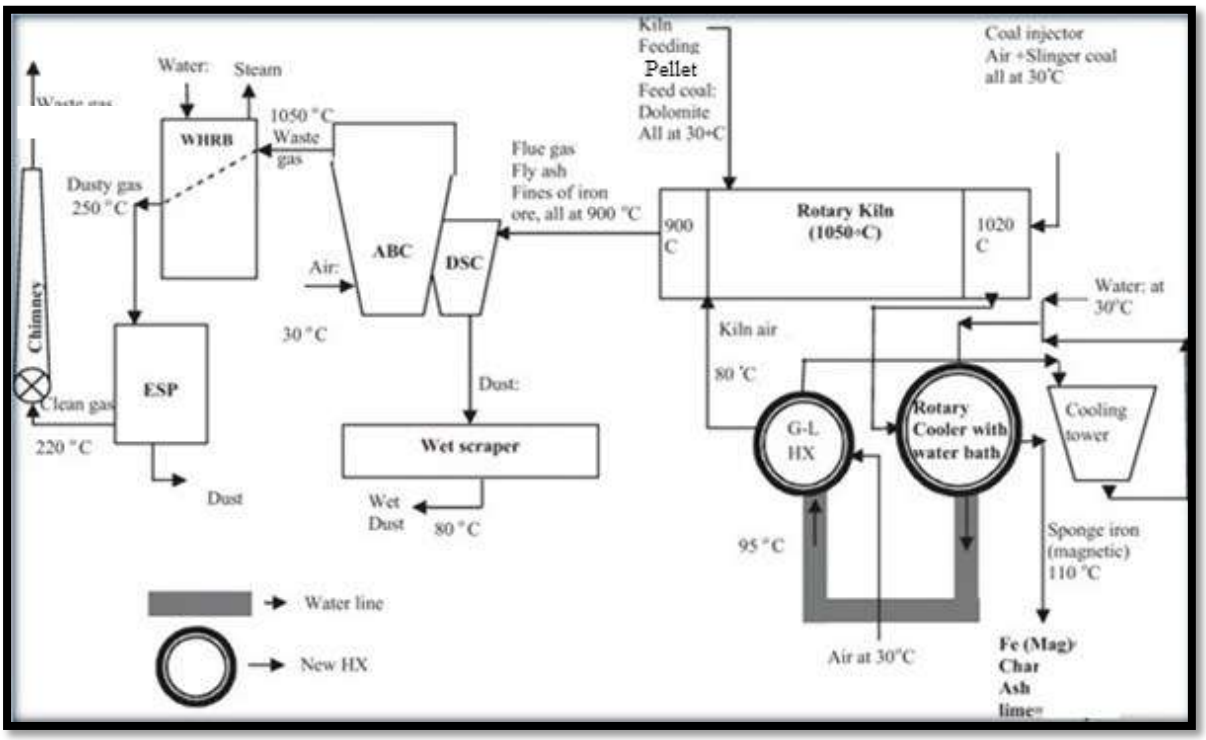


Figure: Process Diagram of CPP

The gases are reduced to around 180 Deg C for the economizer. After the economizer, the gases are let into a ESP which is provided to reduce the dust emission level. An ID fan has been provided to take care of the gas draft losses in the system.

Availability of Technology /Equipment

Power generation from waste heat gases Technology is proven in sponge Iron plants and operating successfully in many sponge Iron plants in India. The technology is available and manufacturing in India by few major companies.

The following benefits are expected by Installing waste heat recovery Power plant using flue gases during the process in sponge iron plants.

- Heat from flue gases is used for power generation. No other raw material is required for power generation
- Reduction in environment Pollution

- ❖ Generated power can be used in SMS which is high power requirement industry. This will save the energy cost.
- ❖ Reduce the GHG emissions.

Coal Washery

Extensive different wash ability studies were carried out by CSPPL for raw coal containing high ash and out of which heavy media cyclone technology out weighted all other similar technology. The major criteria for selecting the heavy media process was that this process would be able to provide the highest possible organic efficiency of 95 – 97 % even with wide variations in raw coal quality.

DESCRIPTION OF ENVIRONMENT

Air Environment

The ambient air quality monitored at 08 locations selected based on predominant wind direction, indicated the following ranges;

PM_{10}: 36.5 to 72.8 µg/m^3.

$PM_{2.5}$: 20.0 to 46.8 µg/m^3

SO_2 : 6.8 to 18.6 µg/m^3

NO_x : 16.2 to 36.4 µg/m^3

Industrial Area Residential, Rural Area (CPCB Norms)	PM_{10}	$PM_{2.5}$	SO_2	NOx
	100 µg/m^3	60 µg/m^3	80 µg/m^3	80 µg/m^3

The concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

A total 16 samples including eight surface & seven ground water samples were collected and analyzed. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (BIS 10500 – 2012) .

Noise Environment

It has found that in the proposed plant buffer zone, noise levels are in the range of 30 to 68 dBA at all eight stations during April 2022. Maximum levels of noise have recorded in day hours which are natural as our most of activities have done in day hours.

Area Code	**Category of Area**	**Limits in dB(A) Leq**	
		Day time	**Night time**
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone**	50	40

**** Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones

Land Environment

Eight Soil samples were collected analyzed for physico-chemical characteristics at selected locations in the study area to assess the existing soil conditions around the proposed project site. The relevant parameters show the following characteristics.

The characteristics of the soil sample were compared with different depths for respective parameters.

The observations of soil characteristics are discussed parameter wise below;

The observations of soil characteristics are discussed parameter wise below;

a) Texture of all soil samples are silty-clay in Texture Classification.
b) Colour of soil samples vary inall the locations S1, S4, S5 and S8 are brownish in color, S2 and S6 are yellow in color and S3 and S7 are black in color.
c) The bulk density of soil samples are in the range of 1.16 to1.62 gm/cc.
d) Soil samples have pH values in the range of 6.8 to 7.66. The pH values are indicating nature of soil samples as neutral.
e) Soil samples have conductivities between 182.6 to 428.6 µS/cm.
f) Soil samples have Organic Matter between 0.89 to 1.68 %. These values represent average fertility of soils.

g) Soil samples have concentration of Available Nitrogen values ranged between 268.4 to 362.4 kg/ha.

h) Soil sample have concentration of Available Phosphorous values ranged between 48.2 to 102.4 kg/ha.

i) Soil sample have concentration of Available Potassium values range between 242.8 to 924.6 kg/ha.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

There will be two major source of air pollution in the plant, fugitive emissions from various material handling and transfer points and flue gases generated from various combustion units. Flue gases generated are cleaned in the Bag Filters/ESP and discharged through stack, so that the dust concentration is well within the prescribed standard.

Height of the all the flue gas discharge facilities is designed as per CPCB norms.

Proper Dust Suppression is existing in the premises, sprinkling on internal roads, regular check up& maintenance of vehicles, it will be ensured that all trucks/dumper will be covered by Tarpaulin.

Water Environment

The company follows "the zero waste water discharge concept" and the entire wastewater is recycled to the plant for various uses. The domestic wastewater will be treated in STP. As no wastewater will be discharged outside the plant premises, there will be no impact on the water quality of any surface water bodies of the area.

Noise Environment

Noise from fans, centrifugal pumps, electrical motors etc. will be kept in control so that the ambient noise level shall not exceed 75dBA during daytime and 70dBA during night time. Noise pollution control measures will be provided in respective departments by way of providing silencers soundproofs cubicles / covers and proper selection of less noise prone machinery and by development of green belt.

ENVIRONMENTAL MONITORING PROGRAMME

M/s Crest Steel and Power Private Limited (CSPPL) is carrying out the Environmental Monitoring on regular basis. The Ambient Air Quality, Meteorological Data, Stack Emissions, Fugitive Emissions, Water Quality, Wastewater Quality, Noise Levels etc. are being monitored as per the existing EC's & consent conditions.

ADDITIONAL STUDIES

The additional studies as per the ToR issued by MoEF&CC are Public Consultation, Social Impact Assessment, Risk Assessment, & Disaster Management Plan.

PROJECT BENEFITS

CSPPL is actively involved in CSR activities for the welfare of the surrounding areas and budgetary provision is made every year.

ENVIRONMENTAL MANAGEMENT PLAN

The management of the has taken CSPPL all the necessary steps to control and mitigate the environmental pollution in the existing project and will continue to do the same in the proposed expansion project. The environmental management plan briefs all the elements of environment pollution controlling systems proposed by the project proponent in operation phase. The environmental management plan describes briefly the action plans to be implemented during the post project monitoring stage as per the Ministry of Environment and Forest (MoEF) New Delhi, Central and State Pollution Control Board guidelines.

The budgetary provision for EMP will be as Rs. 250 Crores & recurring cost is Rs. 17.3 Crores/annum.

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